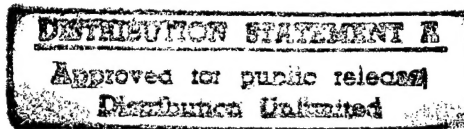


# ***JPRS Report***



# **Science & Technology**

***Central Eurasia:  
Life Sciences***

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# Science & Technology

## Central Eurasia: Life Sciences

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**Chernovtsy Illness Blamed on Rocket Fuel Spill**  
927C0530A Kiev RABOCHAYA GAZETA in Russian  
8 May 92 p 3

[Article by L. Cheredarik, Chernovtsy: "They Buried the Truth in the Offices"]

[Text] "Missile" Version

But most of the facts pointing to the participation of the military in the Chernovtsy tragedy we find in the criminal proceedings brought and closed by the oblast procurator's office with regard to the alopecia epic of 1988. Viktor Frelikh, the chairman of the analysis group of the oblast ecology commission, acquainted me with them. Here is what the documents indicate about the matter.

*The complaint addressed to the Administration of Internal Affairs: "Sometime in the month of June, two large military missiles were passing along our street, and not far from the turn to Russkaya Street, they stopped because of some problem. The missiles sat for two hours under the light of night. An oily fluid could be seen running along the roadway from beneath the missiles, next to which a large group of soldiers were doing something. We saw that at about 0300, after being awakened by the noise of the towing trucks. There were two trucks and two missiles. While they were sitting there, a taxi passed, and the driver saw everything close-up. Literally the next day, they were washing our street and especially the plot across from our homes, where the missiles had been sitting.*

*We ask that you investigate our information. The first children to become ill were on our street and on neighboring streets—Ukrainskaya, Gulaka-Artemovskiy, and Fuchik streets.*

*The residents of Shevchenko Street, 24 November 1988" (with five signatures, illegible)*

As for the taxi driver, there were a lot of rumors going around Chernovtsy back then. They found him, or to be more precise, he found himself.

In the procurator's materials, there are two depositions of the driver, ATP No 72701 Mikhail Sukharev. One is identical to the complaint; the other has more detail. In the second, the driver has this to say:

*"...in the summer of 1988—the exact date I can't remember—I was a witness to the incident. During the second shift, I was taking a fare called into the central dispatcher service. I can't remember the exact time either, but it was closer to the end of the second shift, which would make it two, maybe three in the morning. I was picking up a passenger from International Street, I think it was Building No 7...I went back to Shevchenko Street to get to Lenin Street. When I turned to the right, I saw two military vehicles, next to which were soldiers and officers...The motors of the vehicles weren't running, and all the lights were shut off.*

*"...A day, maybe a couple of days after I saw the trucks, I was again going down Russkaya Street, and I saw the public thoroughfare part of the street being washed down by red fire trucks. I don't remember how many trucks there were, but I can say for sure that there were more than one. They were*

*washing the thoroughfare from the corner at Shevchenko Street to L. Kobylitsa Street. The firemen were wearing gas masks and rubber boots..."*

By the way, Sukharev told Frelikh that when he got home after the shift, he didn't feel well. He began feeling nauseous and began vomiting blood. They put him in the hospital, with the diagnosis of food poisoning. Since then, he has been sick constantly. But that fact isn't reflected in the inquest. Even though the toxic effect was characterized clearly as such by him in the report. You couldn't exactly call the taxi driver talkative. And that's understandable. "I don't want anybody to be calling me on the phone and threatening me," he said during a conversation with Viktor Frelikh.

So let me acquaint you with the report on the work done by investigator A. Gurenko in checking out the missile version of the story.

The statement part of the report lays out the principal aspects of the testimony of the taxi driver. And then the arguments enlisted to refute Sukharev's evidence are cited. Here they are: "In giving his testimony about the circumstances in which he saw the trucks, he was unable to specifically identify the model of the military vehicle (*Is every individual with a high school education supposed to be acquainted with the models of military vehicles? That's something the military are acquainted with, but certainly not everybody else—L. Cheredarik*) He couldn't explain where he was taking the passenger to in the course of the ride."

That's a conclusion, I think, by someone who isn't aware of or doesn't want to take into account the specifics of the work of taxi drivers, who, in the course of just one shift, may pick up dozens of fares. The report contains the following lines: "A check made of the dispatches of the taxi driver Sukharev M. M. for 17 June through 15 August 1988 in the city transportation service established that no call for Sukharev's taxi at night came from International Street." But the same document, Frelikh stressed, says that "the dispatches for 17 and 19 June were not available in the service's archives." But perhaps that is exactly where the records needed for the investigation were. But they didn't even look for them! Besides, it turns out that on 8 July 1988, there were seven calls for taxis from International Street. As Sukharev testifies, he had to wait a long time for the fare. But that detail wasn't illuminated in the deposition.

The investigators reconstructed the circumstances of the incident and testified that Sukharev couldn't clearly point out the building where he picked up the passenger, even though he categorically stated that the passenger was from one of the buildings Nos 7-13 on International Street. And the 21 people questioned indicated that, during that period, they did not call any taxi at night to get home. Well, of course not. In those days, they were being asked to give explanations, and no one knew how the authorities would perceive them. Better to see nothing and hear nothing. It was more peaceful that way. That was the psychology of the frightened member of a totalitarian society.

The events later unfolded in the following manner. They took soil samples from the Shevchenko Street thoroughfare where the dark fluid was leaking from beneath the trucks.

The samples were tested in the laboratory of the chemistry department of Chernovtsy State University, which yielded the following result: "Investigation of the chemical composition of the soil found in the soil no salts of heavy metals, thallium, or other compounds that could have engendered, or served as the cause of, the children's illness." The laboratory of the chemistry department is well equipped, but not for identifying the chemical components of rocket fuel or of combat toxic substances. The procurator's office would have been best off giving the samples to the appropriate military research institutes for analysis. "I don't think our researchers are so poorly trained," concludes the chairman of the analysis group. "I think they simply 'did the best they could.'"

*Then the procurator's investigative group refuted the testimony of 56 residents of buildings Nos 85-91 and 88-100 on Shevchenko Street, forcing them to fill out forms that presented information of a surprisingly similar pattern in its unanimity: "From June to August 1988 inclusive, I did not see on Shevchenko Street any trucks transporting missiles. During that period of time, I did not see any kind of fluid spilled on the Shevchenko Street thoroughfare or the Russkaya Street thoroughfare. I never saw (in 1988) any fire trucks or firemen washing any fluid from the thoroughfare. I did not write any letters to or file any complaints with the chief of the Administration of Internal Affairs of Chernovtsy Oblast Executive Committee."*

*According to a report of the department of fire safety of the Administration of Internal Affairs, fire units were not sent to do any washing of those streets between May and 25 November 1988.*

After that, the oblast procurator's office refers to the military. Here is the data: "Between 15 May and 15 August 1988, there were no missile installations transported through Chernovtsy from the military units that are served by the military procurator's office of the Chernovtsy Garrison. There are no fire trucks in the Chernovtsy Garrison military units."

At that point, one might logically ask this: Could the movements have been from any garrisons that are not local? The procurator's office investigator, advocate first class A. Gurenko, concludes that the explanations of the taxi driver are unconvincing, because they contradict the evidence that has been studied.

Nevertheless, it's too early to close the case. The most curious facts are yet to come.

In May 1990, a letter with the following content came to the editorial office of the oblast newspaper, back then still the RADYANSKA BUKOVINA. I will give it here, in abbreviated form: "I am a regular reader of your newspaper. I've been in the army for the last four months. But I haven't missed an article on the 'chemical illness' topic. The main thing that prompted me to write this letter is this: Why are you pulling the legs of the residents of Chernovtsy and the oblast with your versions and other people's versions and guesses with regard to the illness of the children?...I began my service in military unit No 92341, which is located near the settlement Novoye Misto, which is near Lvov. That's where I

*learned of the true source of the illness among our children. It is rocket fuel that spilled from the tank on a motor vehicle from Novoye Misto onto one of the streets of Chernovtsy (which street I don't know). I learned about all this at a meeting in unit No 92341 from the commander of the unit, Major Kochkin. [signed] Rykhlo V. Yu."*

The letter was given to the oblast procurator's office and then to the military procurator's office of the Chernovtsy Garrison. It was established that that information was confirmed by several other military servicemen from the Chernovtsy Oblast, namely O. Klimov and S. Tarasyuk. Here is what is said in the record of the questioning of V. Rykhlo: "In a conversation with soldiers, Major Kochkin...said roughly the following when he was speaking of the need to observe safety regulations: 'Our vehicle, passing through Chernovtsy, was carrying rocket fuel. Damage to some shutoff valve caused a fuel leak. Everything leaked out onto the streets of the city, until there was only a bucket of fuel left in the tank.'" O. Klimov writes that the commander said he hoped that the new recruits would become good drivers, so that the same thing wouldn't happen to them that happened to one of the unit's drivers, who let rocket fuel leak out in Chernovtsy. In a private conversation with the chairman of the analysis group V. Frelikh, Aleksandr [Kochkin] hypothesized that that soldier was born in Bukovina.

The procurator's office materials contain a record of the questioning of Aleksandr Kochkin, who retracted his words in the following manner: "At one of the instruction sessions with the drivers, I actually did mention that rumors were circulating in Chernovtsy that a military vehicle had spilled fuel in the city and that that was being linked to the children's losing hair. I said those words so that the drivers would observe safety regulations when working with special fuels and servicing the vehicles, since any spilled water or oil could be perceived wrongly by people, which is what happened in Chernovtsy. (Where did the major hear about the Chernovtsy rumors if they weren't reported in the press?—L. Cheredarik) In terms of design, the tanks for transporting special fuels do not have outlets on the bottom. For that reason, a leak of special fuel from the tank is virtually impossible on vehicles in the unit's pool...During my service in this unit (May 1985-June 1990), there have been no exercises involving the transport of special fuels through the Chernovtsy Oblast or through Chernovtsy..." Is that supposed to be convincing? Well, the investigating group of the procurator's office at least was satisfied with the explanation. The fact is simply that all the enlisted servicemen of the emergency service in a meeting with the chairman of the analysis group, Viktor Frelikh, declared, to a man, that there are, in fact, no outlets on the bottom of the containers. They're on the rear of the tank, 5-7 centimeters from the bottom. Consequently, respected commander, "a leak of special fuel from the tank is virtually" possible.

In a word, the conclusion that suggests itself is clear. The major was not being truthful in his testimony to the military procurator's office. And the military procurator's office, in turn, was not trying to get at the truth.

*After becoming acquainted with copies of the materials and speaking with Viktor Frelikh, I got the impression that the brakes had been applied in this particular matter. The people who were dealing with it weren't the ones who should have been—and they were in over their heads. Is it really so difficult, for example, for specialists—not the chemistry laboratory of a university—to determine whether rocket fuel spilled onto the ground or to check the routes taken in troop movements, particularly those involving missile troops. But of course, it's over the head of the oblast procurator's office.*

"That was done knowingly," says V. Frelikh. "After studying 15 volumes of the case in all, I got the feeling that some elusive turning point had occurred in people's frame of mind at some stage of the investigation, and the thallium version sprang up. It was very beneficial to and extremely necessary to someone. That 'someone' was in the military ranks and was closely connected to the services whom that version suited. Moreover, the testing program was supposed to develop a chemical version, and there would be, in particular, space-based and aerial surveys of the city and the oblast. But none of those findings are in the materials of the investigation. In addition, the records of the state and oblast commissions on the hair loss are not available. Perhaps our oblast ecology commission does not have the authority to get them. But, I would suppose that none of those materials is in the procurator's office at all."

The enumerated facts are only the tip of the iceberg. That is why Bukovinans insist on a normal study of the causes of their ecological misfortune of '88. But the fact that the military know how to keep secrets is something we're aware of. Otherwise, they would have to reimburse the losses caused to the health of the Chernovtsy people and to the environment of their city.

#### In Place of Concluding Remarks

Yu. Shcherbak, the minister of environmental protection of Ukraine, recently visited Chernovtsy. The Chernovtsy residents confronted him with the suggestion that a state of emergency be declared in the oblast, because the illness has an etiology that has yet to be explained. But he doesn't agree with them. It looks as if the Chernovtsy misfortune will remain an oblast problem. But we have cause for concern. In the first quarter of this year, morbidity due to focal alopecia was considerably higher than the figure for the same period last year.

**Device for Decontamination of Chernobyl Zone**  
927C0530C Kiev *RABOCHAYA GAZETA* in Russian  
24 Apr 92 p 2

[Article by Yu. Dronzhkevich, Chernobyl: "Everything is 'Rosy': Thoughts on the Introduction of a Unit for Decontamination in the Chernobyl Zone"; first paragraph is source introduction]

[Text] A great deal of time has already been spent at NPO Pripyat with the Vektor program, whose aim is to create a system for gathering, reprocessing, and burying radioactive wastes. A good deal of money has been spent on acquiring such technology and equipment from the Soviet-Swiss enterprise Kombitek, and a pilot plant has been set up for

decontaminating metal in the vicinity of the KPP [not further expanded] Dibrova, where the equipment is installed. But here's the rub—nothing has come of all the commotion yet. The technology is so expensive that there's no sense in cleaning the ferrous metals. The radioactive wastes produced at the end of the process are in the form of liquid and are chemically very active and environmentally dangerous.

And there, nearby, at the Production Association Spetsatom, is an individual who designed an effective installation for decontaminating any kind of material. The equipment can be produced here, in the zone. The cheapness of the process renders profitable the decontamination and the further use of ferrous metals and articles made of them, sanitary engineering equipment, glasses, building structures, materials, etc.

But, unfortunately, that individual has not found, to date, any support at his own enterprise, at the Production Association Chernobylskaya AES, or at the NPO Pripyat, although he has gone there more than once with proposals.

The designer of the unit and the technology is Yu. A. Filippov, lead engineer for the decontamination of equipment and construction materials of the emergency detachment at the Spetsatom Production Association. At one time, in 1961, he worked at the chemical combine Mayak in Chelyabinsk-65. He dealt with plutonium and strontium. Then he worked in Tomsk at the enterprise for producing plutonium; in Zarafshan; and again in Chelyabinsk-65. Here, he's involved with decontamination and has begun to do some thinking and experimenting.

[Dronzhkevich] What brought you, Yuriy Andreyevich, to this problem?

[Filippov] I thought it was too bad that the expensive manipulator for decontamination was lowered into the bath with acid, and it came back with all sorts of little horns and stalks on it. So I started to clean it with an abrasive. First, I used dry sand. It didn't work—the piece was still dirty. I started studying the literature on abrasive treatment. And it turned out that a similar method was used back in 1892 by Demidov. He brought water down from the hills, added sand, and used that to processing castings. I also decided to add water. I started cleaning a unit that weighed more than a ton and a half and was contaminated with about 10 roentgens. As a result, I cleaned it to 5-10 particles. I began to develop the installation, but they didn't let me go all the way—I wasn't able to close the process. And still, with an unfinished installation like that, some 150-200 tons of stainless steel are cleaned and released every year.

In 1987, I began working at the Chernobyl Electric Power Plant. I built an installation here, too, but it has been idle for three years now. I went to the Spetsatom Production Association and began collecting equipment and building a new installation. I finished it. Conducted the experiments. The results were promising. Everything that we took in was cleaned: cable, concrete slabs, fittings, and some assemblies that didn't even have to be disassembled. No matter what the level of contamination, the result was the same—five to six particles.

[Dronzhkevich] Yuriy Andreyevich, how does the decontamination method you propose differ from what is already being used for that purpose?

[Filippov] There's no secret to it. I've explained everything more than once, shown the blueprints to the specialists from the NPO Pripyat and the station. But nobody wanted to try to understand it. After all, this is the third installation. I built the first—they plundered it and the second, too, and now I'm working on improving the third.

[Dronzhkevich] Still, tell me about the layout of the installation and the technology.

[Filippov] I used a simple system. The abrasive can be anything, including the sand that's beneath our feet. A solution pump and a diffusion mixer. The water, I decided to enclose, since it can't be discarded. I added to it some chemical components and got an abrupt settling of suspensions. So the water is used in a closed loop: it works, is cleaned, and goes back to work. And there're also an air compressor, hoses, and nozzles, where the aqueous solution of the abrasive and compressed air are mixed. Depending on the abrasive and the length and pointing angle of the stream, the thickness of the compressed surface layer can be regulated. For metal, the thickness of the compressed layer can be regulated from two to six microns. The abrasive itself is washed off and again brought back to work, whereas the radioactive wastes are deposited in a separate container, where their consistency is like that of toothpaste. From Chelyabinsk, I brought a recipe for enclosing that mass in glass.

[Dronzhkevich] And what if you encounter dissolved plutonium?

[Filippov] It can be removed from solution with a number of methods. There are exchange resins, there's a technology developed at the Uralsk Polytechnic Institute in which the solution is passed through ordinary filings to which some component has been added.

[Dronzhkevich] And what about the money spent for decontamination? Will it pay for itself?

[Filippov] All the technology is very inexpensive. In fact, we can generally work at full cost recovery. On the existing installation, for now we will be able to clean small assemblies and parts, pieces of equipment, cable, and sanitary engineering equipment; we will be able to sell them and, from the profits, pay for what we spend on electrical power; we will be able to pay wages and, with what's left of the profits, start to develop and build a bigger installation, a laboratory for contamination inspection, and a shop for packing the cleaned articles.

[Dronzhkevich] But there also exists the problem of fear of radiation. Who is going to have anything to do with mechanisms or materials taken out of the zone? Besides, the Ukrainian Cabinet of Ministers has adopted a statute that forbids taking them out of the zone. [Filippov] That statute was adopted because it was thought that nobody could truly clean the materials that were left in the off-limits zone. Of course, people are taking them out anyway. But we are cleaning them. I have a process chart and all the analyses.

But if the things being taken out were to be inspected by an independent organization, then people could be convinced that it's not hazardous to their health.

[Dronzhkevich] Then how do you explain the negative assessment of your method of decontamination that was given by the deputy director of the SP [not further expanded] Kompleks for operations, V. Frolov?

[Filippov] That was two and a half years ago. Frolov didn't even lay eyes on my installation, much less test it. If he himself had come, looked it over, tested it, I think everything would have gone alright with him. They built an installation identical to mine at the SP Kompleks, but it didn't use abrasives. I didn't have any secrets. I showed them how it should be done, I gave them the blueprints. And they did it wrong.

[Dronzhkevich] Last question. Will working on your installation be harmful to the health of the service personnel?

[Filippov] In Chelyabinsk, I processed parts that were extremely contaminated. During the work, they did analyses of the air, and it was clean. Radioactive dust is settled by a mist of water. That was verified at three plants: in Chelyabinsk for plutonium, in Tomsk for strontium, and in Zafarshan for quartz. They have to work in waterproof suits [gidrokostyumi], of course. But walking around the streets of Chernobyl and breathing the air with the dust that is stirred up by motor vehicles is more hazardous than working on my installation.

Such is the story of how a gifted man thinks, creates, knocks on all the doors, but nobody pays attention to him. Some apparently fear losing prestige and monies, others don't want to take a risk. Others yet don't mind sticking to what we're doing now (and Yuriy Andreyevich told me about one particular instance), and for still others, "everything is rosy," as long as they collect their wages, and the trips abroad for contracts and negotiations continue. But the man is already on the verge of despair. After all, he is always being made to feel that nobody needs his work, that it's of no interest, that he isn't a "firm." So he curses the "bucket-and-pail" system and feels certain that he could definitely find sponsors in the West. And what if, perhaps, he's right? How many stories have we heard in the recent past about people whose inventions none of us had any use for, but who became millionaires because of them "elsewhere"! Why doesn't NPO Pripyat support him if nobody needs him at the Spetsatom Production Association? What's so incredibly precious that would be at risk? Of course, they would have to do a preliminary professional assessment of what Yu. A. Filippov has already done.

**Fires in Chernobyl Zone Spread Radiation**  
927C0530H Kiev GOLOS UKRAINY in Russian  
5 Jun 92 p 7

[Article by N. Khriyenko, reviewer specializing in the Chernobyl accident: "What Burned Down in the Zone?"; first paragraph is source introduction]

[Text] Alarming reports come into Kiev every summer: Fires have started in the Chernobyl zone. The wind fans the radioactive smoke and carries it hundreds of kilometers to uncontaminated land.

This year, the first big fire broke out in early May in the Narov lyanskiy Rayon of Belarus, and from there, the fire spread to the land within the 30-km zone, enveloping part of the Kiev Oblast on the left and right banks of the Pripyat. That's the information reported by the firemen who protect the facilities of the NPO Pripyat in the 30-km off-limits zone around the Chernobyl AES. In just six days, the fire spread across three and a half thousand hectares in Ukraine. Specifically, the fires destroyed 1,100 hectares of grassland in fields and swamps, 2,100 hectares of ground cover in conifer forest, and 300 hectares of timber. Several dozen farms in the settlements of Benovka and Kliviny were also destroyed.

Fighting the fire were 190 firemen and a good many militia members and staff members of the NPO Pripyat. They used various kinds of equipment and helicopters. The fires were put out, but at a high price—the health of people. After all, even the professional firemen didn't have up-to-date protective gear against the radiation in the area of the fire, where the level of radionuclides is growing dozens of times over. And the "leaf" [lepestok] type respirator offers virtually no protection against radiation during a fire. As before, the fires are put out primarily with so-called swatters (that's a large sheet of rubber fastened to a wooden stick). As during the accident at the Chernobyl AES, the firemen, in dueling with the fire, are wearing kersey boots, because they don't have the proper outfits or any special equipment.

Recent fires in the 30-km zone illuminated several ironic problems. Specifically, that involves the fact that the Ukrainian Ministry of Forest Management and the NPO Pripyat are not carrying out to the fullest extent the complex of fire-prevention measures in the abandoned settlements and in the forests: No mineralized swaths have been established, neither the abandoned settlements nor the forests have been plowed around, and the fields that are overgrown with weeds have been left to the whims of fate. And what wasn't done earlier, has to be done during a fire. Specifically, lay 1,500 kilometers of mineralized swaths. In effect, the leadership of the Ministry of Forest Management and the NPO Pripyat did some fast thinking only when they got burned.

The Chernobyl firemen feel that to thoroughly solve the problem of the fires in the forests of the 30-km zone, the Ministry of Forest Management and the Ministry for Chernobyl of Ukraine must create a specialized forestry establishment with a fire/chemical station that is outfitted with modern equipment. In the meantime, the firemen are armed with just "swatters" and kersey boots. And a sincere thank you to those courageous people who, in losing their health, are protecting us from radioactive winds.

### Dioxin Contamination of Soil, Water

927C0531A Moscow STROITELNAYA GAZETA  
in Russian No 10, Mar 92 p 9

[Article by Vladimir Sokolovich, chief research colleague at VNIIOspa, doctor of technical sciences: "Ecology: Alarm Signal. Dioxin Contamination"]

[Text] For more than ten years foreign scientists in developed countries have been extremely concerned with the terrible ecological threat posed by environmental pollution with dioxins and organic compounds similar to them. Dioxins even in very small concentrations can have a ruinous effect on the human body, causing immune, mutagenic, carcinogenic, hepatogenic, teratogenic and other diseases.

The symptoms of human dioxin poisoning are damage to the skin, its darkening, hypertrichosis, damage to the liver, heart, pancreas, lungs, nervous system, weakening of the lower extremities and functions of sensory organs, suppression, and neurasthenia. Many foreign scientists believe that dioxin is the most dangerous substance synthesized by man.

Dioxins are a side product of many production processes based on the use of aromatic compounds, especially benzene and phenol, their chloride formations. Underestimation of these "enemies to nature" resulted in the active development of imperfect production processes and led to the release of dioxins into the environment. The ineffectiveness of purification structures, wetting the base of the structures with phenol waters, and the use of unacceptable methods of chemical fixation of the soil contributed to this.

We all know about the tragic events in Bashkiriya. Here the soil and ground water were contaminated with dioxins in large areas. Dioxins were found in the atmosphere, food, and reservoirs. In Ufa in the spring of 1990, tremendous amounts of phenol water were discharged into the Ufa and Belaya rivers, which supply potable water to the city. The dioxin levels in the rivers were 147,000 times higher than the maximum acceptable concentration. Moreover, the water contained excessive amounts of phenols as well.

We know that the maximum acceptable concentration of phenol in potable water should not exceed 0.001 mg/l, or 0.01 mg/l for tetrachlorobenzene. However, when both of these compounds are present in an alkaline environment a reaction for forming dioxin immediately begins. The acceptable level for dioxin (in spite of its poor solubility in water) is hundreds and even thousands of times lower than that of the original reagents. Other harmful compounds similar to dioxin, such as tetrachloronaphthalene, may also be synthesized. Tetrachlorobenzofurane may form when soils are fixed with furan resins.

Conditions favoring the formation of dioxins in the soil are set when the foundations are accidentally moistened with alkaline water. They are strongly intensified in such soils, especially with the forced filtration of alkaline solutions through them. Soils fixed in this manner are in essence reactors for dioxin synthesis. They may be in operation for a very long time. There is active chemical distention and destruction of underground structures and communications. The environment suffers great harm, since at least 100 kilograms of the caustic are used per cubic meter of fixed soil.

The authors of this barbarian method of adding alkali to the soil are the Ufa Commercial Construction Scientific

Research Institute and, strange as it may seem, the Department of Engineering Geology and Geological Environmental Protection at Moscow State University, which should be concerned with ecological purity.

There is one more method of fixing loess soils, silicization, which calls for the addition of large amounts of alkaline waste from the Krasnovodskiy Petroleum Refining Plant. They contain aromatic compounds and aminocomplex additives. When these reagents react in the alkaline environment of the silicate solution, the dioxin analog tetrachlorodiazobenzene forms. This extremely hazardous method was proposed by the Department of Engineering Geology and Soil Science at Leningrad State University.

The irresponsibility of the authors of chemical fixing of soils, including the addition of alkali, simply boggles the mind. These processes are still being used by the Ufa Commercial Construction Scientific Research Institute in rayons of the ecological tragedy in Bashkiriya and Rudnyy Altay. And although society and many leading scientists in the CIS are categorically against the illegal methods, their opinion is being ignored. The developers, oppressors of nature, avoid scientific discussion in every way possible, motivated by the fact that the method of adding alkali to the soil was approved by the former USSR Academy of Sciences. But it never studied chemical fixation of soils; moreover, it is powerless to clean-up dioxin.

How can we combat the unanticipated tragedy? It is thought that injection solutions capable of preventing the formation of the extremely hazardous dioxins and their analogs in the chemically fixed soils need to be developed. Moreover, in the field of foundation construction we cannot delay in the search for effective methods of purifying soils heavily contaminated with dioxins, or else we will not be able to avoid a great disaster.

#### Water Pollution in CIS

927C0531B Moscow STROITELNAYA GAZETA  
in Russian No 10, Mar 92 p 16

[Article by T. Ostrovskaya: "What Kind of Water Are We Drinking?"]

[Text] Not only popular science, but even completely serious medical and biology journals in Western Europe often discuss the urgent problem of how to determine the sex of a future child. The Australian scientist William Lester claims that it depends on the water the parents drink. If the water is hard, it is more likely that a boy will be born. If the water is soft, a girl is more likely to develop.

I would like to say something using the words of a pupil in an old anecdote: "Teacher sir, I wish I had your problems". Infant mortality in the CIS is five times higher than in Western Europe. It is true that it has dropped by 3.3 percent in the past year. A well-fed Englishwoman can predict whether a son or daughter will be born by whether the parents drink hard or soft water. But our young peasant wife somewhere in the Russian countryside where there is no plumbing simply wants to have a child, and it would be nice if it were healthy. The French have been sounding the bell everywhere that they are drinking water that contains a

dangerous dose of nitrates, 25 ml/l. The French Ministry of Health was shaken by such a "deadly" result of water quality. They even talked about it in a national meeting.

The chief state health physician in Moscow officially announced that 45 ml/l of nitrates in Moscow drinking water does not exceed "our" current norms.

Drinking water increased in cost in Australia by 31 percent, 20 percent in Italy, and 4 percent in Germany over the past year. But in Russia it increased by 500 percent! And that has been in this year alone.

In the British Isles the problem of drinking water has become so heated that it is becoming a political issue: will the ruling party remain in power if water purification does not reach the optimal quality the government is obligated to provide using the most modern equipment? Each English family has placed a filter on the faucet (what if they didn't?). The English, proud of their conservatism, still live according to the principle "We are not so rich as to buy cheap things".

In our neglected capitol dirty water from the streets and from factories enters the overflow sewage system. Samples are taken from the sewage wells. And if you know the variety of products from the factories, you can "eyeball" the approximate composition of the discharges flowing from manmade streams into the natural reservoirs. Then you take a series of samples in ten test tubes, if transportation is available, several kilometers to a laboratory. Then you analyze. You may get the result within a few minutes (which is almost impossible) or in five days. In a word, if something enters the rivers in and near Moscow on Monday, it will be Thursday before we know exactly what it is. At best we can analyze one sample per day, with analyses made on a monthly or quarterly basis. They say that there is good equipment, but it is still being tested...

Our government is wronging us. "There" a politician becomes undone if the people are poisoned with water containing 25 mg/l nitrates, but here we have almost twice the level, and it is normal. "There" they have the computer age, "here" we run with test tubes. "There" the lords in parliament t-a-l-k about drinking water, but "here" those elected by the people do not even think about it.

Who is kidding who? Don't we know where we live? Of course we know. In 1990, for example, 16 tons of rocket fuel was dumped into the White Sea, causing the death of hundreds of tons of fish. Those that did not die were eaten. Five million starfish were killed. A government commission was created. We do not yet have the results of its research. We don't have any fish either.

Odessa received plumbing 100 years ago. It has worked without repairs to our day. But nothing lasts forever. The pipes burst. Their contents ended up in the Black Sea. An analysis showed a concentration of heavy metals 1,000 times the maximum acceptable concentration. Specialists joked (after all, they are Odessites!) that at such rates of pollution the Black Sea would very soon become a visual chemistry textbook. It would have the entire Mendeleev table (in a most terrible combination).

We need 20 times more devices for cleaning up the feces and constantly growing piles of garbage from the beaches and shores than we currently have. Health resorts in Sochi, Odessa, and the Crimea are under threat of closure this year.

As a result of an accident, 5,000 cubic meters of unpurified discharge was dumped into the Taganrogskiy Bay of the Azov Sea.

There are more than enough examples. There is no pure water within the former Soviet Union, with the exception of inaccessible mountain rivers, but even these are becoming subject to ecological pollution.

What are the results? In the 27 territories of Russia people are starting to become extinct. We may ask, Why is a nation that drinks dirty water becoming extinct? Have the seas and rivers become a cesspool? Are there no other reasons? Unfortunately there are many. But dirty water today is not the primary reason. But what if it becomes the primary reason tomorrow? Then what? After all, without water nothing matters.

According to several scientists, a hepatitis B epidemic is anticipated for this summer and fall. The reason is polluted water and universal lack of hygiene. Hepatitis B affects the liver, causing cancer and cirrhosis. An effective treatment for this "pleasure" has not yet been found in the world.

### Contaminated Mine Reopened

927C0532A Moscow KOMSOMOLSKAYA PRAVDA  
in Russian 01 May 92 p 2

[Article by V. Kosyak, KOMSOMOLSKAYA PRAVDA correspondent: "Coal Fever Like Occupational Disease"]

[Excerpt] [Passage omitted] An event typical of our time recently took place in the Donbass: A mine contaminated by a military chemical plant was reopened. Nobody can guarantee that there is no poison awaiting its victims in the depths of the mine. But the people went down into the mine. If anyone would have tried to stop them, they would have been swept aside. [passage omitted]

### Radiologists on Investigation of Radioactivity in Byelarus

927C0534A Moscow KOMSOMOLSKAYA PRAVDA  
in Russian 12 Jun 92 p 3

[Interview with Ye. Petryayev and V. Nesterenko, by O. Yegorova and T. Korsakova: "We Are Not Dust in the Wind".]

[Text] The past six years have softened the image of Chernobyl, and the political events of the past months have made us almost forget about the disaster. But in Byelarus now it is moral for the scientist to make sure that the average person is not alone in coping with the Chernobyl disaster.

We are speaking with Yevgeniy Petrovich Petryayev, professor and director of the radiochemistry department at Byelarus State University, and Vasilii Borisovich Nesterenko, corresponding member of the Byelarus Academy of Sciences and director of the Radiation Safety Institute.

[Petryayev] The half-life for plutonium, cesium, and strontium is long, and for at least the next 150 years we will not have an easy life.

Incidentally, we now have many people talking about plutonium, its prevalence, and its danger. We need to understand that plutonium as such did not escape on its own. Plutonium in a matrix with uranium dioxide was released from the reactor in the form of fuel particles and hot particles.

For the first years the particles, which contained beta- and gamma- radiating isotopes, laid on the soil surface. Now they are one to two centimeters deep. Therefore, all those who were able to avoid the danger when the cloud moved are now at risk from the soil being stirred up and carried by the wind, especially when crop fields are being worked.

We first reported this publicly in 1988. This prompted an explosion of indignation from the government, especially in Gomel Oblast. Three scientists were threatened with loss of their degrees and titles as a result.

[KOMSOMOLSKAYA PRAVDA] Were there reasons for this?

[Petryayev] In principle there were certain reasons, because it was announced in a television appearance. The next day a strike began in Gomel. At that time they said that the hot particles were not only in Gomel Oblast, but practically everywhere, including Minsk. You could say that the hot particles (it depends on the concentration) were also throughout Byelarus.

[KOMSOMOLSKAYA PRAVDA] Are there any physical methods for studying them?

[Petryayev] There is a very simple method—photography. A chestnut leaf is gathered, an X-ray film is laid on it, and a picture is produced.

Electron photographs have also been made of such particles.

[KOMSOMOLSKAYA PRAVDA] Are there photographs of human lungs?

[Petryayev] Yes. The first that we took were to research the soil. We found that there could be thousands to tens of thousands of such hot particles in a single square meter—even up to 100,000. We immediately wondered what the effect was on the lungs.

[KOMSOMOLSKAYA PRAVDA] For tractor drivers, for example...

[Petryayev] Yes. We publicized the first data for a scientific society in the fall of 1990, at the first congress of radiobiologists. It caused a sensation then because no one had such data. It was easy to work with soil; lungs were much more difficult. We investigated the lungs of people that had died of various causes. We have recently obtained this information during operations on the lungs (which are becoming more frequent). The physicians say that pulmonary diseases in the area have become unusually complicated...

...I get the impression that the particles in the soil are beginning to decay. The large ones are becoming smaller.

This is when it is very dangerous: plutonium can enter the water, but even more dangerous is americium-241. Thus, I see in the future the situation may get worse, because in nature water is recycled.

[KOMSOMOLSKAYA PRAVDA] What about in the lungs?

[Petryayev] In the lungs I see that the concentration of particles is decreasing. And this means only one thing: The particles in the lungs are decaying just like in the soil and beginning to migrate throughout the body! After all, plutonium is virtually not excreted.

There is not anything that can act on the hot particles. We have tried to treat the soil with heavily concentrated acids, but it was not effective.

According to radiobiologists, the particles that enter the lungs begin to burn and melt the tissues. Medics are already seeing the formation of cavities in the lungs and liver. Caverns. Vacuums. Micro- and macrocavities. Of course, not everybody knows about this.

[KOMSOMOLSKAYA PRAVDA] What do people know about plutonium and americium?

[Petryayev] Wherever the plutonium has reached a certain level of pollution people have been evacuated. But imagine the border. On one side there is more "pollution", less on the other. People live there. Plutonium-241 with a half-life of 14 years was at least 100 times more prevalent than the more dangerous plutonium-239. During the six years that have passed, at least one-third of the plutonium-241 has decayed. A similar amount of americium-241 atoms have formed. It will be the same in six more years. People living in areas that were considered relatively safe will be exposed to americium.

[KOMSOMOLSKAYA PRAVDA] So we are talking about qualitative conversion and a shift in pollution?

[Petryayev] Yes! And then a new wave in relocations and remapping the radioactive pollution for americium. Americium is more mobile than plutonium. It is an extremely important problem. One laboratory cannot perform the tremendous work of mapping alone. We should have a separate science program for this. The large scale transition of plutonium to americium will begin in approximately 7-8 years, meaning that an area polluted with plutonium-241 will have about the same amount of americium-241.

[Nesterenko] Nature itself has given us these fourteen years to be able to take the necessary measures and protect the people.

[KOMSOMOLSKAYA PRAVDA] How does the Byelorussian government view all this?

[Petryayev] They look at it rationally. The previous government did not give me any trouble, either. With the exception of the fact that prior to 1988, I knew everything but could not say anything. We were prohibited from making our findings known. We discussed this matter with Shushkevich, and he put it well (after all, he is a physicist): Yes, we could have tried to make our findings known in 1986, but how long do you think we would have been talking? But the government did not interfere with our work.

[KOMSOMOLSKAYA PRAVDA] But they did not help?

[Petryayev] Basically. All of the reports submitted to the government and Slyunkov were passed by. Prior to 1986 none of us tested produce. Everyone ate what there was.

I should say that the Byelorussian State University and Academy of Sciences accomplished what then was a completely heroic act. They did all that was possible and necessary: They placed instruments in factories, dairy plants, and markets...

[KOMSOMOLSKAYA PRAVDA] Are you now sure that the "dirty" produce that comes from contaminated areas is being destroyed?

[Nesterenko] I work with local centers for radiation monitoring. We now have good government monitoring, but the villages themselves...

What we found in Stolinskiy Rayon, which incidentally was not the most polluted, was astonishing. Everything is in order in the government sector, but the milk from private cows is very "dirty". The people are drinking live radiation.

We established our own dosimetric centers in these villages. We taught the people (generally the teacher is a physicist or chemist) to set up the equipment and then hired dosimeter technicians. We found that even if you drink only milk here you get more than 0.1 rem per year from milk alone.

I did not believe it. But our dosimeter technician continued to report this. Olmyany village. They sent one instrument and checked a second. It was terrible. We found up to 4,000 Bq per liter. Then we took a team of ten men and worked directly at the site. What did we find? Olmyany village is in a forest. The pastures belong to the collective farms. Where could the people pasture their cattle? In the "dirty" swamps and forests. Each family has five, six, seven children... We covered the forest and found eleven squares of perfectly clean land (approximately 1,000 hectares of land). This land needs to be cultivated. It needs to be reclaimed. They need to allow pasturing, and then the milk will be clean. But it is a forest. It is another department. They would not allow it.

Then there is the village of Gorodnaya. They have "only" 2.3 Ci per square kilometer. But we found children that had accumulated 0.4 rem per year. They have clean hayfields there. However, since 1989 the people have been prohibited from cultivating the land because it is the upper boundary of the cranberry preserve. We asked whether the cranberry was clean. No. You can't eat the cranberry. So why is it protected?

Based on these very alarming data from local specialists, we asked the government to give the clean land back to the people.

We signed an agreement this year to make 300 such "Public Local Centers for Radiation Monitoring of Produce for the Public". We need at least two times that number.

I will note that today, in my opinion, the situation is worse than in 1986. Then we knew that some kind of assistance for Chernobyl would be given. Now there is no money and no help is anticipated.

**Generation and Applications of Monoclonal Antibodies Against Seal Alkaline Phosphatase**

937C0020A Moscow in Russian No 4, Apr 92  
(manuscript received 14 Feb 91) pp 1900-1906

[Article by I.Yu. Sakharov, Ye.B. Mechetner, Ye.Ye. Yefremov, I.Ye. Stepanova, B.V. Shekhonin and O.Yu. Pletyushkina, Scientific Research Laboratory of Biologically Active Substances of Hydrobionts, USSR Ministry of Health, Moscow; Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow; Institute of Physicochemical Biology imeni A.N. Belozerskiy, Moscow State University; UDC 577.1]

[Abstract] Monoclonal IgG1 antibodies (designated APP.1) against alkaline phosphatase (EC 3.1.3.1) isolated from the small intestine of the Greenland seal (*Phoca groenlandica*) were generated by immunization of BALB/c mice with the enzyme and fusion of immune splenic cells with murine myeloma Sp 2/0 cells. In solid-phase enzymeimmunoassay (EIA) binding kinetics yielded a  $K_d$  of  $8.5 \times 10^{-10}$  M; however, enzyme activity was not affected. APP.1 reacted just as well with alkaline phosphatases isolated from the common seal (*Phoca vitulina larga*), fur seal (*Callorhinus ursinus*) and deer (*Rangifer faraudus*), and to a lesser extent with the bovine calf enzyme. Use of APP.1-enzyme complexes (formed by incubation of the antigen-antibody mixture for three hours at room temperature and storage at  $-20^\circ\text{C}$ ) in solid phase EIA significantly increased the sensitivity of the test for HIV-1 and HIV-2 antigens. Finally, the complex was also useful in immunohistochemical detection of cytokeratin-8 in human kidney cells and vimentin and cytoskeletal disruption in mouse embryo fibroblastoid cells. Figures 4; references 17: 3 Russian, 14 Western.

**Enzymeimmunoassay (EIA) for Spotted Fever Group Rickettsia**

937C0020B Moscow LABORATORNOYE DELO  
in Russian No 11, Nov 92 (manuscript received  
08 Feb 91) pp 67-69

[Article by S.N. Shpynov and N.V. Rudakov, Omsk Scientific Research Institute of Endemic Infections, RSFSR Ministry of Health; UDC 579.881.11.083.3]

[Abstract] Long-term immunization of rabbits with antigen adsorbed to aluminum hydroxide resulted in the generation of IgG antibodies against spotted fever group rickettsia. Use of the immune IgG in a sandwich modification of enzyme-immunoassay (EIA) [Voller, et al., J. Clin. Path., Vol 31, p 507, 1978] provided a system that exhibited 10- to 20-fold greater sensitivity than did complement fixation in detecting soluble antigens of *Rickettsia sibirica*, *R. akari* and *R. conori*. The system was less sensitive in detecting cell-bound *R. sibirica* antigens, but subjecting *R. sibirica* to three freeze-thaw ( $60^\circ\text{C}$ ) cycles resulted in sufficient solubilization of antigens for ready detection. Studies on ixodid ticks collected in Altay Kray, an area endemic for spotted fever, yielded an 86.2 percent positive rate in EIA, 78.2 percent in immunofluorescence assay, and 60.4 percent in passive hemagglutination. Ticks collected in Omsk Oblast, an area free of spotted fever, were routinely negative. References 5: 2 Russian, 3 Western.

**Degradation of Natural Polymers by Bioactive Substance-Producing Mycelial Fungi**

937C0020C Moscow in Russian No 4, Apr 92  
(manuscript received 11 Jan 90) pp 687-694

[Article by V.G. Babitskaya and V.V. Shcherba, Institute of Microbiology, Belorussian SSR Academy of Sciences, Minsk; UDC 576.31:582.287.238]

[Abstract] Bioconversion studies were conducted with the higher basidial fungi *Tyromyces lacteus* and *Goriolus hirsutus* using surface growth on flax fibers and grain straw. In both cases protein content of the fungi rose from 4-6 to 15 percent, with most (41-48 percent) consisting of assimilable albumins well balanced in terms of essential amino acids. In addition, 60 percent or more of the lipid content consisted of unsaturated fatty acids with predominance of linolenic acid. The fungi degraded 58 percent of the substrate hemi-cellulose, 94 percent of the pectins, 53 percent of the cellulose, and 40-45 percent of the lignin. The degradation products were represented by glucose and xylose mono- and trisaccharides. Figures 2; tables 3; references 20: 16 Russian, 4 Western.

**Distribution, Population Density, Probability of Biocenotic Contacts and Degree of Synanthropization of Wild Canines (Canidae) in Natural Rabies Foci of the USSR**

927C0483A Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 71 No 4, Apr 92 pp 115-130

[Article by G.N. Sidorov, A.D. Botvinkin, M.G. Malkova and V.R. Krasilnikov, Omsk Scientific Research Institute of Natural Focal Infections, and Voronezh Oblast Epidemiological Station; UDC 599.742.1:576.858.21(47+57)]

[Text] Field studies in the Central, Central Chernozem, Volga, Siberian and Far Eastern regions provided results used to determine the abundance and examine the features of intra- and interspecific contacts and the degree of synanthropization and anthropic influence upon populations of wild canines. The distribution of predators and rabies virus with respect to land type was studied, and maps of infection density and of the population densities of the fox, wolf, raccoon dog, corsac, and jackal in the USSR were plotted using census data and multiannual data on fur procurement and the incidence of rabies among the animals. Ecological factors responsible for determining the persistence of rabies infection were revealed on the basis of a comparative analysis of the biology of canines and the epizootological manifestation of rabies foci.

Another in a series of natural rabies epizootics began in Eurasia in the 1940's. Persistence of natural foci of this infection is the root cause of the epizootic and epidemiological problems of the entire RSFSR and most contiguous republics. Canine rabies continues to dominate in Central Asia and the Transcaucasus<sup>1,7,11,15,22,30,35,37</sup>. The principal natural hosts and carriers of rabies virus in the country are the fox, wolf, raccoon dog, corsac, and jackal. The polar fox is the principal host of the tundra form of rabies—*dikovaniye*. It is commonly assumed that the density threshold of a population of one or a combination of several species of canines above which a rabies epizootic develops is around three specimens per 10 km<sup>2</sup>. Besides this indicator, the spatial distribution, biotopic distribution, intensity of intraspecific and interspecific contacts, and the species diversity of the virus's natural hosts have been analyzed in order to study establishment of infection<sup>11,14,24,29,30,41,44</sup>. However, the existence of stable indicators for the incidence of rabies among agricultural and domestic animals is evidence of insufficient development of ecological and epizootological surveillance over territorial and temporal changes in the natural foci of this infection. The purpose of our work was to study the features of the retrospective and present distribution of the principal natural hosts of rabies virus, to reveal ecological factors responsible for the features of territorial establishment of infection, and to test new parameters characterizing the state of natural rabies foci.

Observations were made of predator populations in the spring-fall period of 1986-1990 in Astrakhan, Saratov, Voronezh, Bryansk, Tula, Omsk and Novosibirsk oblasts and Altay Kray on 21 permanent plots. During this time an area of 2,953 km<sup>2</sup> was surveyed and 730 predator burrows were mapped, including 122 with litters. Frequently published materials gathered in 1976-1985 in Amur and Chita oblasts,

and Khabarovsk Kray, and the Tuva ASSR were also included in the work<sup>24,28</sup>. The abundance of Canidae, as well as of the badger, was determined by Chirkova's method<sup>36</sup>. Six thousand eight hundred forty-eight persons were surveyed in 1986-1990 in an analysis of "retention" ["ose-daniye"] of furs in the population<sup>2</sup>. The absolute abundance of canines was estimated from hunting records of the RSFSR Glavokhota [Main Administration for Hunting and Game Preserves] for 1984-1988. Procurements of the pelts of predators in family Canidae and the incidence of rabies among all groups of animals in the USSR in 1960-1989 were analyzed. Cartograms of the distribution of procurements of fox, wolf, raccoon dog, corsac, and jackal pelts, and of the incidence of rabies among all animal species in 1960-1988 and in 1984-1988, per 1,000 km<sup>2</sup>, were compiled on the basis of these materials using Tupikova's procedure<sup>33</sup>. Cartograms for Siberia and the Far East were plotted in relation to administrative regions; for other territories of the RSFSR and Kazakhstan—in relation to oblasts, krays and ASSR's; for the rest of the country's territory—in relation to union republics. Geographic interpolation was employed in a number of cases to determine more specifically the population density of predators in administrative territories situated in certain landscape zones<sup>34</sup>. Published data and our own data for the 1960's-1980's were used to estimate the actual population density on cartograms pertaining to specific species; as a rule, the abundance of predators was determined on the basis of litters, and mandatorily expressed as specimens or litters per area<sup>3,8,16-19,28,30,37-40, etc.</sup>. The cartogram for the integral indicator of total population density for all canines was plotted on the basis of the sum of points characterizing the density of procurements of different species, where a very low density for one species corresponds to 1 point, a low density corresponds to 2 points, a moderate density corresponds to 3 points and so on. Indicators for land development in the RSFSR in 1985 were studied<sup>10</sup>. The materials were treated using correlation and dispersion analysis [Plokhinskiy, 1970].

Because we used pelt procurement data to study the distribution of wild predators, the status of commercial hunting was subjected to additional study with the purpose of revealing the level of unofficial "retention" of furs within the population. In addition, "retention" of furs, when taken together with procurement indicators, validly characterizes the level of direct contacts between hunters and wild carriers of the virus at the time of their acquisition and removal of their pelts which, as we know<sup>12</sup> has epidemiological significance. Until the late 1960's, "retention" of furs was apparently 6-9 percent of the total yield<sup>31</sup>. After that, this process began to grow, reaching to 90-100 percent in the late 1970's and early 1980's in relation to fox, corsac, and raccoon dog pelts<sup>2,13,24,25</sup>. Procurements began to grow everywhere in 1983 in connection with an increase in fur purchase prices, and according to our estimate, they increased to 20 percent of the total yield of fox furs; this process affected the corsac to a lesser degree. Wolf pelts were always turned in to a fuller extent in the RSFSR because bounties were paid for killing wolves. An analysis of "retention" of fox and corsac pelts, carried out in regions separated from one another by questionnaire survey and by actual counting of all articles

made from their fur which were held back from the state, revealed this process to be consistent in all places both in the European and the Asian RSFSR<sup>13,25,26</sup>. This is apparently

the result of social factors, and it is well illustrated by a count of persons utilizing fur in different regions of the RSFSR (Table 1).

Table 1. Numbers of Persons Utilizing Fox Fur in the European and Asian RSFSR in 1986-1990

Territory, Year	Number surveyed	Percent utilizing fur		
		Women	Men	Total
Bryansk, 1988	896	3.9	1.7	2.9
Voronezh, 1988, 1989	1,397	4.7	2.8	3.8
Orenburg, 1989	660	3.2	2.8	3.0
Perevolotsk, Orenburg Oblast, 1989	82	7.1	0.0	4.9
Total for European RSFSR, 1988-1990	3,035	4.2 +/- 0.5	2.4 +/- 0.4	3.4 +/- 0.3
Novosibirsk, 1986	728	3.6	1.4	3.2
Tyumen, 1988	666	4.3	0.4	2.7
Omsk, 1988	931	4.9	0.9	3.0
Cherlak Settlement, Omsk Oblast, 1988	320	3.8	0.0	2.5
Sargatka Settlement, Omsk Oblast, 1990	218	8.0	1.5	6.0
Irkutsk, 1989	950	6.0	1.3	3.8
Total for Asian RSFSR, 1986-1990	3,813	4.8 +/- 0.4	0.9 +/- 0.2	3.3 +/- 0.3
Total for RSFSR	6,848	4.6 +/- 0.3	1.7 +/- 0.2	3.3 +/- 0.2

Data from the treated material show that official pelt procurement indicators can be used validly both for comparative evaluation of the territorial distribution of predators and, following additional calculations using Bakeyev's method,<sup>2</sup> for analysis of the dynamics of their abundance, typical of each time period of "retention" of furs in the population.

Let us examine the distribution of different predator species.

The fox inhabits practically all of the territory of the USSR. A cartogram showing the distribution of the fox in the country, based on the fur yield per unit area in 1924-1955, was plotted by Chirkova<sup>17</sup>. Similar work was done for Yakutia, the Far East, Siberia and the European USSR<sup>18,20,30,40</sup>. We plotted a cartogram of the population density of the fox in the USSR on the basis of fur procurement data for 1984-1988, supplemented by litter counts (Figure 1). It follows from a comparison of the data that on the whole, the general nature of the distribution of the fox in recent years did not change from what it was 30-60 years ago. The maximum population density of the fox in the USSR is currently noted in the Volga region, the Caucasus, the Transcaucasus, the Baltics, and in the country's Central Chernozem region, as well as in certain territories of Ukraine and Central Asia. In these regions the population

density indicator for the species reaches 10-15 specimens per 10 km<sup>2</sup> and more following the reproductive season. According to published data available to us, the maximum was recorded in the late 1970's and early 1980's in Rostov Oblast, in the floodplain of the Northern Donets—around 32-36 specimens per 10 km<sup>2</sup><sup>9</sup>. The abundance of the fox decreases eastward, and especially northeastward. It follows from our data (Table 2) that on the average the population density of the fox in the European RSFSR (5.3 +/- 1.2 specimens per 10 km<sup>2</sup>) is 2.8 times higher than in Western Siberia (1.9 +/- 0.3 specimens per 10 km<sup>2</sup>) ( $t = 2.5$ ). An insignificant increase in density is observed in insular Siberian forest steppe (Kansk, Achinsk, Irkutsk-Balagansk, Selenginsk, Barguzin), as well as in Central Yakutia and in the middle reaches of the Kolyma River. While for mountains of Southern Siberia this population density of the species is relatively large, it is typical of steppe and forest steppe landscapes of the Southeastern Transbaykal and Tuva. In these regions, in 1976-1985 we counted 167 foxes over an area of 1,140 km<sup>2</sup>, or 1.5 +/- 0.6 specimens per 10 km<sup>2</sup>. This indicator is also significantly lower than in the European RSFSR ( $t = 2.4$ ), but it does not differ statistically from that in Western Siberia. In the south of the Far East, the abundance of the animal increases once again, attaining 12-18 and even 28.5 specimens per 10 km<sup>2</sup> in certain biotopes<sup>40</sup>.

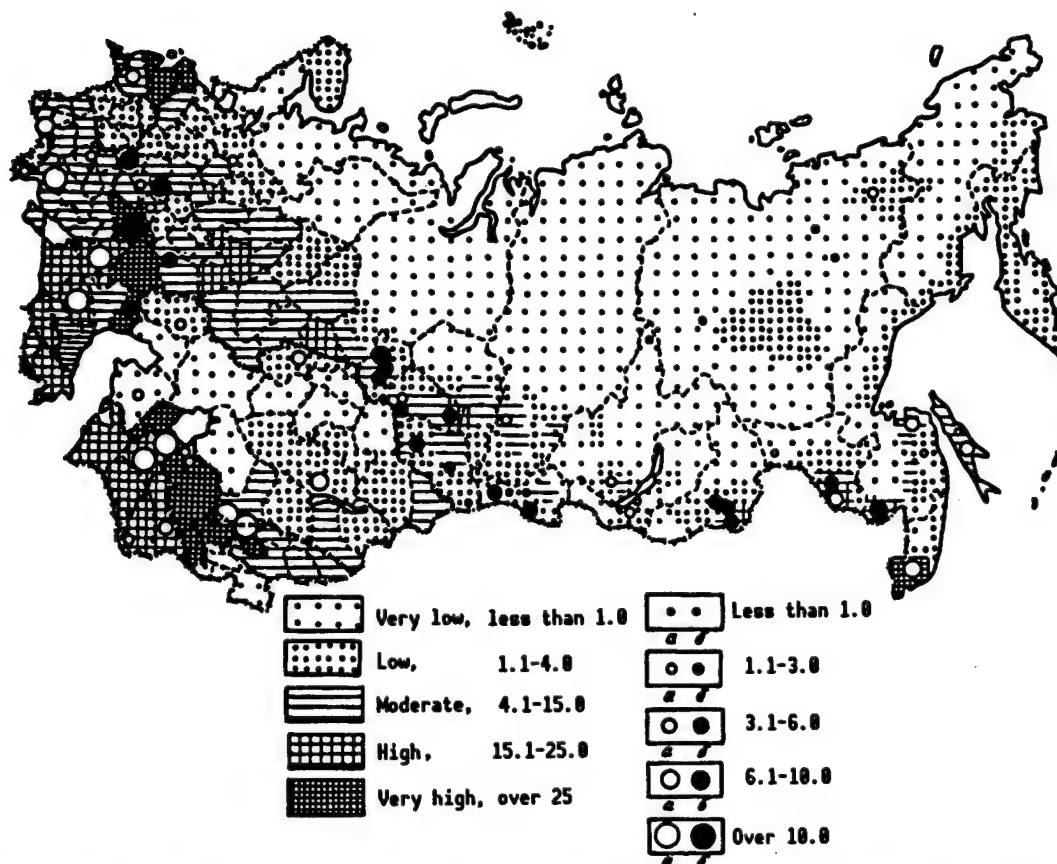
Table 2. Abundance Records for Wild Canines Based on Litter Counts in the European RSFSR and Western Siberia in 1986-1990

Plot Number	Kray, oblast, rayon	Year of record	Area, km <sup>2</sup>	Population density per 10 km <sup>2</sup>			
				Fox	Raccoon Dog	Corsac	Total
	Astrakhan Oblast						
1	Akhtubinskiy Rayon	1989	50	3.2	—	3.2	6.4
	Saratov Oblast						
2	Saratovskiy Rayon	1988	35	9.1	—	—	9.1
	Voronezh Oblast	1989	35	2.3	—	—	2.3
3	Bobrovskiy Rayon	1988	10	16.0	—	—	16.0
4	Buturlinovskiy Rayon	1988	18	13.3	—	—	13.3
5	Kalacheyevskiy Rayon	1988	30	5.3	0.3	—	5.6
6	Petropavlovskiy Rayon	1988	60	13.5	1.5	—	15.0
	Bryansk Oblast						
7	Zhukovskiy Rayon	1988	25	6.4	—	—	6.4
8	Trubchevskiy Rayon	1988	50	8.0	0.2	—	8.2
9	Navlinskiy Rayon	1988	50	3.2	—	—	3.2
10	Navlinskiy Rayon	1988	60	1.3	—	—	1.3
	Tula Oblast						
11	Shchekinskiy Rayon	1990	50	4.2	1.6	—	5.8
12	Plavskiy Rayon	1990	175	2.9	0.9	—	3.8
	Total for European RSFSR	1988-1990	648	5.3+/-1.2	1.0	3.2	7.4+/-1.3
	Altay Kray						
13	Kosh-Agachskiy Rayon	1986	30	0.3	—	2.7	3.0
14	Smolenskiy Rayon	1986	50	4.2	—	—	4.2
		1987	60	1.5	—	—	1.5
15	Volchikhinskiy Rayon	1986	30	4.7	—	2.6	7.3
		1987	40	5.2	—	—	5.2
	Novosibirsk Oblast						
16	Karasukskiy Rayon	1986	300	1.0	—	—	1.0
		1987	300	1.3	—	—	1.3
17	Maslyaninskiy Rayon	1987	25	2.8	—	—	2.8
	Omsk Oblast						
18	Cherlakskiy Rayon	1986	150	0.2	—	2.1	2.3
		1987	130	0.5	—	1.2	1.7
		1988	140	0.5	—	1.1	1.6
		1989	140	1.0	—	1.1	2.1
		1990	150	1.4	—	0.5	1.9
19	Cherlakskiy Rayon	1988	50	1.4	—	1.6	3.0
		1989	60	3.5	—	—	3.5
		1990	60	2.3	—	—	2.3
20	Sargatskiy and Gorkovskiy Rayons	1988	80	0.9	—	—	0.9
		1989	80	1.8	—	—	1.8
		1990	105	2.7	—	—	2.7
21	Tyukalinskiy Rayon	1986	30	7.0	—	—	7.0

**Table 2. Abundance Records for Wild Canines Based on Litter Counts in the European RSFSR and Western Siberia in 1986-1990 (Continued)**

Plot Number	Kray, oblast, rayon	Year of record	Area, km <sup>2</sup>	Population density per 10 km <sup>2</sup>			
				Fox	Raccoon Dog	Corsac	Total
		1987	40	7.0	—	—	7.0
		1988	65	5.4	—	—	5.4
		1989	90	2.4	—	—	2.4
		1990	100	4.3	—	—	4.3
	Total for south of Western Siberia	1986-1990	2,305	1.9+/-0.3	-	1.2	3.1+/-0.4

Note: Abundance was determined in Bryansk Oblast with the participation of V.L. Adamovich, and on plot No 16—jointly with V.V. Shibanov.



**Figure 1. Population Density of the Fox Based on Mean Annual Pelt Procurement Indicators for 1984-1988, per 1,000 km<sup>2</sup>, and Litter Counts From Published (a) and Our Own Sources (b), Expressed in Specimens per 10 km<sup>2</sup>**



Figure 2. Population Density of the Wolf Based on Mean Annual Pelt Procurement Indicators for 1984-1988, per 1,000 km<sup>2</sup>

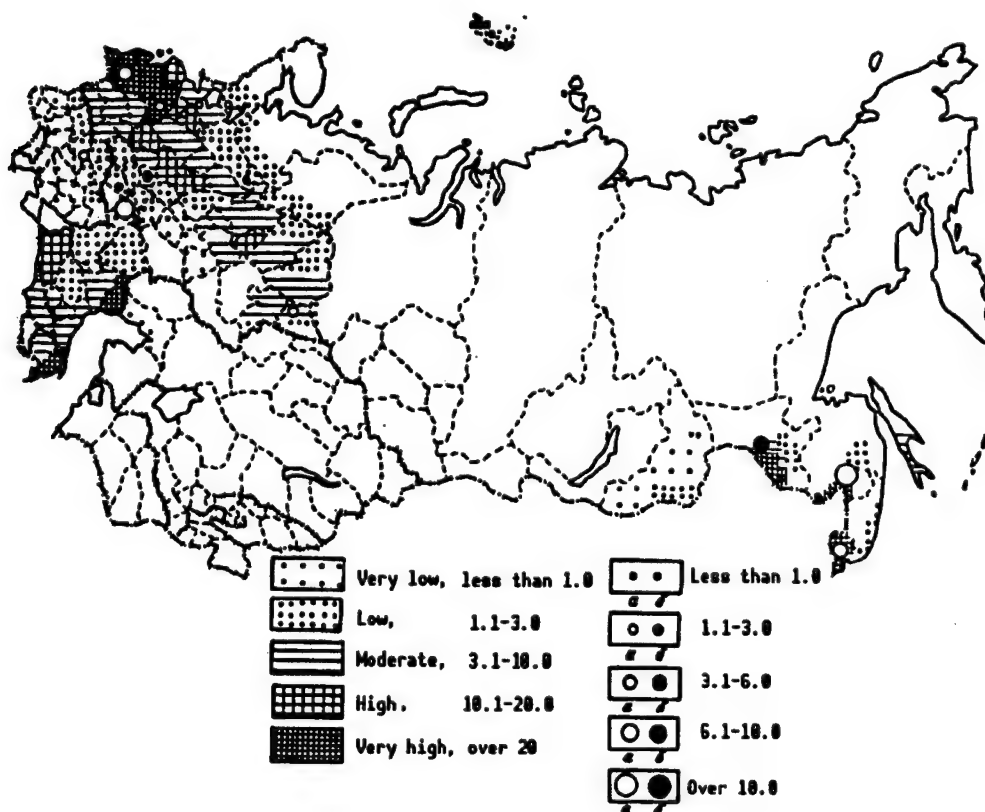


Figure 3. Population Density of the Raccoon Dog Based on Mean Annual Pelt Procurement Indicators for 1984-1988, per 1,000 km<sup>2</sup>, and Litter Counts From Published (a) and Our Own Data (b), Expressed in Specimens per 10 km<sup>2</sup>

The wolf. As with the fox, this species is ubiquitous. Cartograms of the population density of the wolf are available for the USSR and individual regions of the country<sup>8,32</sup>. The cartogram we offer (Figure 2) is not a pioneering effort, but it was plotted with the purpose of permitting subsequent estimation of the total population density of all Canidae. In the USSR, according to 1984-1988 procurement data, this predator is in its largest numbers in the Volga region, in the Caucasus, Byelarus and Kazakhstan, and in Bryansk and Smolensk oblasts. It is present in relatively large numbers in the Volga-Vyatka region, in Voronezh, Kursk, Tver and Pskov oblasts, and in certain regions of Altay, Tuva and the Eastern Transbaykal. Specific wolf population density data are cited in the monograph<sup>8</sup>.

The raccoon dog exhibits a preference for aquatic biotopes. Cartographic analysis of the distribution of the species was carried out for the Far East and the Transbaykal<sup>30,39</sup>. We plotted a cartogram of the population density of the raccoon dog for the territory of the USSR as a whole (Figure 3). Its maximum abundance is now observed in the south of the Far East, in the Volga delta and in the Baltics. There are many animals in the Northwestern and Central economic regions, and fewer in the Volga-Vyatka and Central Chernozem regions. Within the bounds of the western part of its range, the raccoon dog has been observed in recent times as far as Kurgan and Tyumen oblasts inclusively. The species is encountered in the Eastern Transbaykal and in the Urals. The maximum population density of the raccoon dog—20 specimens or more per 10 km<sup>2</sup>—was noted in Maritime

Kray and in the Amur region<sup>39</sup>. According to our data this indicator was 0.8-6.6 specimens per 10 km<sup>2</sup> in forest steppes of the Central Amur and Zeysko-Bureinskaya plains in 1976 and 1979-1980, and from 0.2 to 1.6 specimens in the forest steppe of the Central Russian Plateau (Table 2).

The corsac is encountered on USSR territory in open southern landscapes. The density distribution of the species was analyzed earlier for Southern Siberia<sup>30</sup>, and now it has been analyzed for the entire territory of the country (Figure 4). The maximum abundance of the corsac occurs in the semidesert and steppes of the Caspian Depression. It is present in large numbers in some regions of Kazakhstan, Bashkiria, Orenburg, Chelyabinsk and Chita oblasts, and in Altay plains and foothills. This species occurs in the south of Western Siberia, Tuva, the Western Transbaykal, Chyskaya Valley and in Central Asia. In open landscapes, according to our data the abundance of the corsac may exceed the abundance of the fox by 2-10 times. In the country, the highest population density of the animal was noted in Eastern and Central Kalmykia—29 specimens per 10 km<sup>2</sup><sup>4</sup>. In Central Kazakhstan this indicator reached up to 20<sup>36</sup>, and in the Southeastern Transbaykal up to 10, while in the southern regions of Tuva it was up to 3.5 specimens per 10 km<sup>2</sup><sup>27</sup>. In recent years the population density of the corsac was 0.5-2.7 specimens per 10 km<sup>2</sup> in the steppes of Western Siberia, and 3.2 specimens in the Astrakhan semidesert and in the vicinity of Lake Baskunchak (Table 2).

The population density distribution of the jackal is evaluated in Figure 5. There are many animals in waterside biotopes of the Caucasus, Kazakhstan and Central Asia.

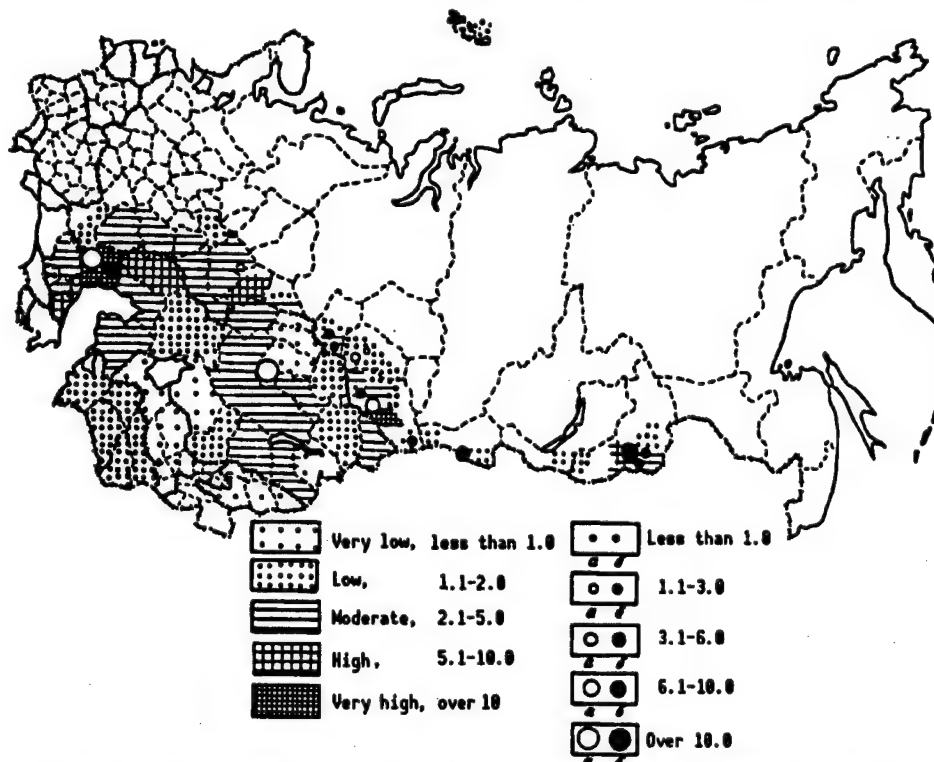


Figure 4. Population Density of the Corsac Based on Mean Annual Pelt Procurement Indicators for 1984-1988, per 1,000 km<sup>2</sup>, and Litter Counts From Published (a) and Our Own Data (b), Expressed in Specimens per 10 km<sup>2</sup>

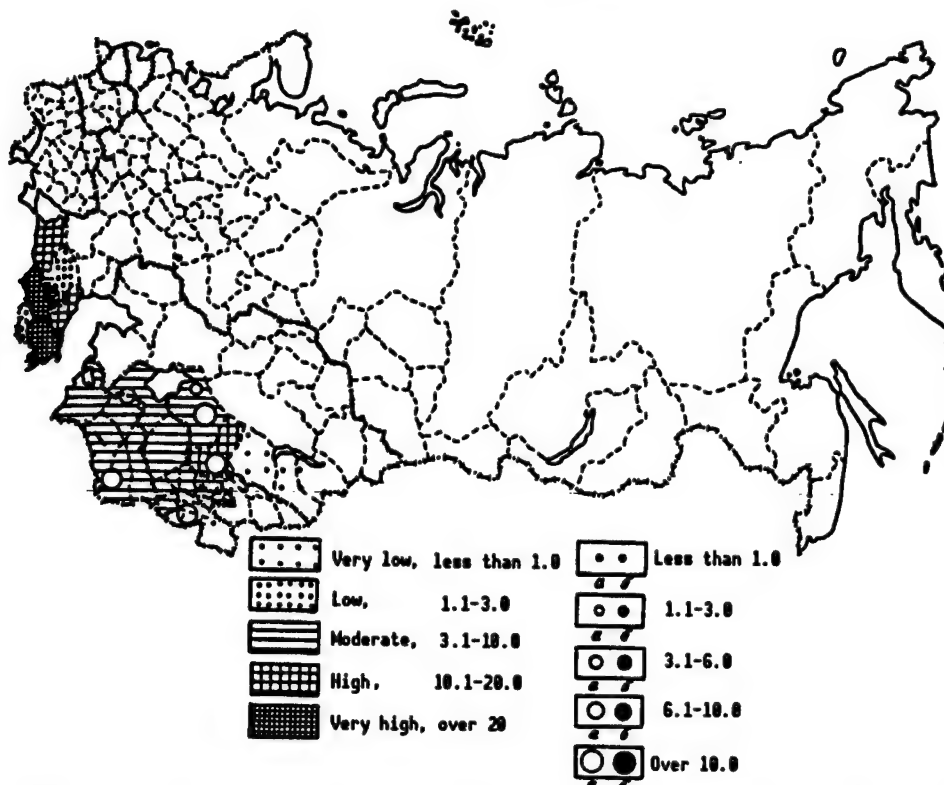


Figure 5. Population Density of the Jackal Based on Mean Annual Pelt Procurement Indicators for 1984-1988, per 1,000 km<sup>2</sup>, and Litter Counts From Published Data, Expressed in Specimens per 10 km<sup>2</sup>



(a) Southern boundary of burrowing by the polar fox  
(b) Boundary of regular incursions by the polar fox

Figure 6. Integral Indicator of the Combined Density of Fox, Wolf, Raccoon Dog, Corsac and Jackal Populations Based on Pelt Procurement Data for 1984-1988, in Points, and the Distribution of the Polar Fox as Determined by Shilyayeva<sup>20</sup>

The polar fox inhabits the tundra and the forest-tundra (Figure 6). Its population distribution, biotopic distribution and population density are illuminated in detail in the special literature<sup>17,20</sup>. The *dikovaniye* virus, which is associated with the range of the polar fox, is believed to be weakly pathogenic to man by some researchers; however, deaths of people due to rabies are registered from time to time in this region<sup>23</sup>.

Thus the territorial distribution of the population density of each Canidae species on USSR territory exhibits a mosaic pattern, and it possesses unique features.

The nature of the distribution of predators in the canine family with respect to specific land types and the density of rabies morbidity can be evaluated on the basis of Table 3.

**Table 3. Distribution of Predators in the Canine Family and Rabies Morbidity Among the Animals in Different Administrative Territories of the RSFSR in 1984-1988 Depending on Land Type and Land Use (Correlation Coefficient)**

Land Type	Species				Morbidity
	Fox	Wolf	Raccoon Dog	Corsac	
Hayfields, pastures, fallow land, brushland, unsuitable land	0.64	0.42	0.38	0.66	0.45
Plowland	0.38	0.36	-0.29	-0.44	0.65
Forest	-0.57	-0.34	-0.08	-0.46	-0.26

It was established by three-factor dispersion analysis that landscape features and land use significantly determine 70.9, 65.2, 62.5 and 62.6 percent of the territorial distribution of the fox, wolf and corsac and the incidence of rabies among the animals respectively in 1984-1988 ( $P < 0.01$ ). Additionally illustrating the data in Table 3, we note presence of a well-known relationship indicating that the corsac does not inhabit plowland and avoids forested areas<sup>17</sup>. Of the 87 breeding burrows of this predator that we examined in 1977-1990, only 3.4 percent were located in plowland and 1.1 percent were located in brushland.

Elevated population densities of several species of predators simultaneously are noted in some regions of the RSFSR. According to fur procurement data for the territory of the RSFSR as a whole, significant agreement between the present population densities of different species and those of a quarter of a century ago is noted only for the fox and the wolf (Table 4). However, a number of unique features are revealed when this phenomenon is examined on a larger scale. For example a relatively higher population density is observed for all species of the canine family simultaneously in the steppes and forest steppes of Southern Siberia and the Far East<sup>30</sup>. In our estimation (Figure 6), several regions characterized by moderate and elevated combined population density of three to five species of predators in the canine family may be distinguished in the RSFSR and in contiguous republics—the Baltics, Central Russian, Volga, Northern Caucasus, Southern Ural, Western Siberian and Kazakhstan, Transbaykal, Southern Far Eastern, and Arctic. The validity of such a division is additionally confirmed by unique features in the distribution of antigenic variants of the rabies virus<sup>5</sup>. We used this zonation as the basis for classifying natural foci of rabies infection also because the distribution of rabies in the RSFSR basically coincided with total Canidae density from the 1960's to the 1980's. This is confirmed by correlation, cartographic and factor dispersion analysis (Table 4, figures 6-8). Thus according to three-factor dispersion analysis, the combined distribution of the wolf, fox, raccoon dog and corsac in the RSFSR was 88.3 percent responsible for territorial establishment of

rabies virus in 1963-1967, and 74.9 percent responsible in 1984-1988 ( $P < 0.01$ ). It follows from the analysis (Figure 8) that in the 1960's, the incidence of rabies among animals usually exceeded one specimen per 1,000 km<sup>2</sup> in the presence of a complex combination of high or moderate population density of the wolf (1B, 1C), fox (2B, 2C), raccoon dog and (or) corsac (3B, 3C). In some cases the incidence of rabies was determined by the high population density of just the fox alone (1H, 2B, 3H). This combination is typical for example of the margin of the Western Siberian-Kazakhstan natural rabies focus—the Kuznetsk forest-steppe basin<sup>29</sup>, and apparently for endemic territories of Western Europe where, as we know<sup>42,43</sup>, the population density of the fox reaches 30-40 specimens per 10 km<sup>2</sup>. According to our data (Table 2), in the second half of the 1980's the average total population density of canines was 7.4 +/- 1.3 specimens per 10 km<sup>2</sup> in Astrakhan, Saratov, Voronezh, Bryansk and Tula oblasts, while the same indicator for Altay Kray and for Novosibirsk and Omsk oblasts was 3.1 +/- 0.4. In 1984-1988 the average rabies morbidity for these groups of territories was 1.4 and 0.22 sick animals per 1,000 km<sup>2</sup> respectively. This study of the population density distribution of Canidae was a part of the work of epidemiological zonation of the RSFSR with respect to rabies<sup>6</sup>.

**Table 4. Coefficients of Correlation Between the Densities of Canine Procurements, and Between the Combined Population Density and the Incidence of Rabies Among Animals in Different Administrative Territories of the RSFSR**

Species, Rabies Morbidity	Years	
	1963-1967	1984-1988
Fox-wolf	0.38	0.52
Fox-raccoon dog	0.21	0.18
Fox-corsac	-0.07	-0.06
(Density of fox + wolf + raccoon dog + corsac)-(rabies morbidity)	0.60	0.57

However, the experience of surveying known natural foci and exploring new ones reveals situations where the conditions of an epizootic do not always arise, or where rabies morbidity is found to be inadequately low after wild canines attain a sufficiently high population density. As a confirmation of this, we can cite data obtained in research on the situation in areas of Novgorod, Ivanov, Kostroma and Kirov oblasts, and in the Northern Ossetian and Dagestan ASSR. Therefore when we explore natural foci, in addition to determining population density and the number of species acting as the principal carriers of the virus, we suggest estimating the absolute abundance of Canidae, the openness and degree of agricultural development of the landscape, and the extent of its mosaic pattern in mountain conditions<sup>11,24,30</sup>. Thus, the coefficient of correlation between the absolute abundance of all species of canines and the incidence of rabies among the animals in 1984-1988 in

administrative territories of the Volga, Ural and Western Siberian regions is 0.52 ( $P < 0.05$ ). Despite the frequently high density of Canidae populations in the mountains of the Transcaucasus and Central Asia (Figure 6), rabies morbidity is found chiefly among dogs, which induce outbreaks of "canine" rabies in agricultural animals. The unique features of the existence of natural rabies foci in mountain conditions were studied in detail using the Transbaykal as an example. Thus, in the Southeastern Transbaykal the mountain landscape was responsible for nonuniform distribution of foxes, corsacs and wolves, separation of optimum habitats and a low level of contacts between the animals, which was one of the reasons for the low level of spontaneous infection of wild canines in this region by rabies virus<sup>24</sup>. Obviously the roughness and mosaic pattern of the mountain landscape determine the particular distribution of animals in all places and reflect upon the biocenotic contacts of the predators.

**Table 5. Estimation of the Distance Between Litters of Predators in Different Regions of the RSFSR in 1986-1990**

Plot Number	Oblast	Distance Between Litters, km			
		Fox	Fox - Corsac	Fox - Raccoon Dog	Fox - Badger
1	Astrakhan	3.0	4.0 +/- 0.8	—	—
2	Saratov	3.3 +/- 0.4	—	—	—
6	Voronezh	2.7 +/- 0.4	—	1.9 +/- 0.8	—
11, 12	Tula	5.8 +/- 0.9	—	3.9 +/- 1.6	2.2 +/- 0.5
Total for European RSFSR		3.7 +/- 0.4	4.0 +/- 0.8	3.0 +/- 0.9	2.2 +/- 0.5
16	Novosibirsk	7.8 +/- 1.3	*	—	8.7 +/- 0.8
18	Omsk	10.6 +/- 1.7	12.6 +/- 1.0	—	11.7 +/- 0.8
19	Omsk	7.4 +/- 1.6	9.0 +/- 2.6	—	2.5 +/- 0.3
20	Omsk	9.5 +/- 1.7	*	—	4.7 +/- 0.7
21	Omsk	6.7 +/- 0.6	—	—	2.5 +/- 0.4
Total for south of Western Siberia		7.8 +/- 0.5	11.7 +/- 1.0	-	6.3 +/- 0.5

\*The corsac was not counted on the plots, although it had been encountered previously.

We will conditionally estimate the probability of intraspecific and interspecific contacts between mammalian predators on the basis of the distance between their litters and traces of vital activities of different species in breeding, residential and visiting shelters. For the European RSFSR as a whole, the distance between fox litters is 2.1 times shorter than in Western Siberia ( $t = 6.4$ ) (Table 5). Similar indicators for the corsac, as well as for the fox and corsac in the semidesert landscape in the vicinity of Lake Baskunchak, are two to three times lower than in the steppes and southern forest steppe of Omsk Oblast, while between litters of the fox and raccoon dog in the forest steppe of the Central Russian Plateau the distances are almost four times lower than between litters of the fox and corsac in open landscapes of Western Siberia (Table 5). The distance between litters of predators depends to a significant extent on their population density. We demonstrated this mathematically by establishing a high degree of negative correlation between the population density of the fox and the distance between its litters,  $r = -0.71$  ( $P < 0.01$ ). A similar pattern is also

noted for the badger,  $r = -0.46$  ( $P < 0.05$ ). Mixed traces of the vital activities of the fox and raccoon dog were discovered in 28 percent of their burrows while those of the raccoon dog and badger were found in 13 percent of burrows in natural rabies foci in Ukraine<sup>37</sup>. According to our data, in Voronezh and Tula oblasts the first indicator was 15.8 and 9.3 percent respectively, while the second in Tula Oblast was 2.3 percent. The same indicator for the fox and corsac in the south of Omsk Oblast was an average of 4.6 percent, while in Chita Oblast it varied in different years between 1 and 4 percent. This is evidence that the possibility of contacts between predators of the canine family is higher in the Central Chernozem and Central regions of the RSFSR than in the south of Western Siberia and the Transbaykal, and such contact is adequate to establishment of natural rabies foci (Figure 7). Thus our data indicate that the frequency of intraspecific and interspecific contacts between predators is directly dependent on the population density of the carnivores. However, despite the revealed relationship we suggest estimating biocenotic contacts in

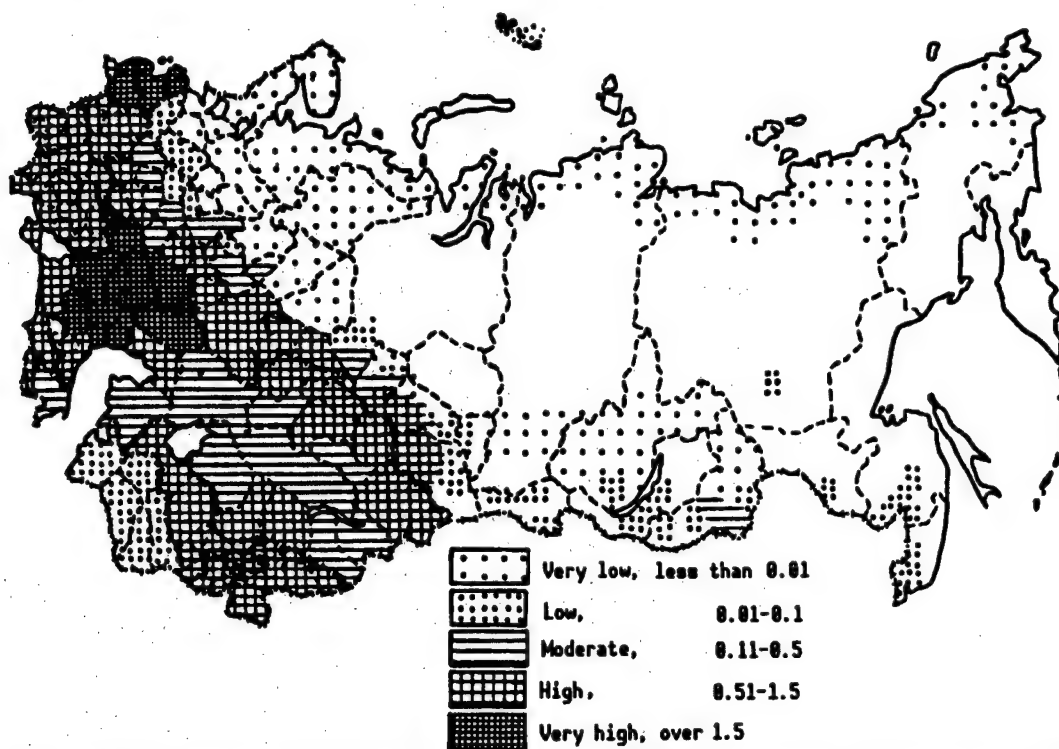


Figure 7. Mean Annual Incidence of Rabies Among Animals in 1960-1988, Expressed in Specimens per 1,000 km<sup>2</sup>

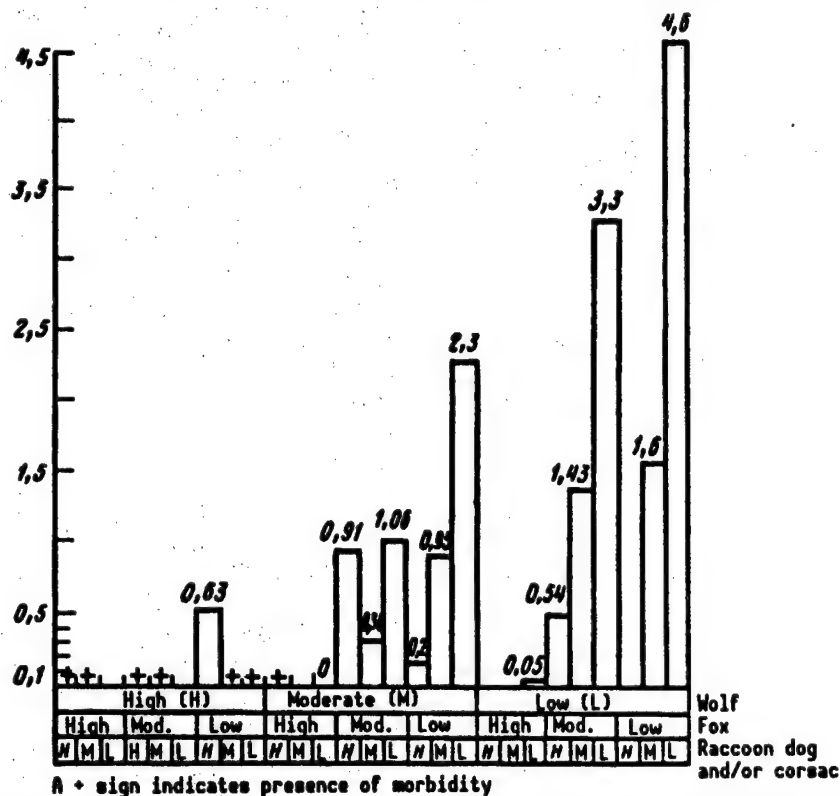


Figure 8. Histogram Compiled From Three-Factor Dispersion Analysis of the Relationship of the Incidence of Rabies Among Animals to Different Quantitative and Qualitative Combinations of the Population Density of Wild Canines in the RSFSR in 1963-1967: ordinate axis—mean annual incidence of rabies among animals, expressed in specimens per 1,000 km<sup>2</sup>; abscissa—population density of predators in points

addition to revealing the population density of the animals as one of the ecological parameters characterizing a natural rabies focus.

The probability of contacts of people with mammalian predators is associated with the particular features of the spatial distribution of the populations of these animals. The coefficients of correlation between the density of the human population on one hand and the density of the fox, wolf, raccoon dog, and corsac populations on the other in different administrative territories of the RSFSR are 0.30, 0.09, 0.02 and -0.20 respectively. According to our data the average distance from a fox litter to the nearest human settlement (village, farmstead etc.) is  $2.6 \pm 0.3$  km in the European RSFSR and  $4.3 \pm 0.4$  km in the south of Western Siberia. For the raccoon dog, this distance is  $3.0 \pm 1.3$  km (European RSFSR), and for the corsac it is  $7.4 \pm 0.5$  km (the Asian RSFSR). Differences are statistically significant in all cases ( $t > 3.1$ ). The remains of domesticated birds (which do not stray far from their home) near breeding, residential, and visiting burrows of the fox are an additional indicator of the degree of its synanthropization. In Voronezh, Tula and Bryansk oblasts this indicator is 3.5 times higher than in Omsk Oblast, being 11.8 and 3.4 percent respectively ( $t = 2.2$ ). We offer these methodological approaches as a means of evaluating the degree of synanthropization of wild Canidae in natural rabies foci. Direct contact between hunters and foxes may also be assessed both on the basis of information on official fur procurements and on the basis of the degree to which pelts are utilized by the population. According to our data, 3.3-3.4 percent of the adult population wears articles made from fox fur both in the European RSFSR and in Siberia (Table 1). Inasmuch as the population of the European RSFSR (119 million persons) is three times larger than in the Asiatic RSFSR (42 million persons), the total number of contacts between hunters and foxes associated with trapping the animals and removing their pelts is three times larger in western regions than in eastern ones, which additionally increases the risk of catching rabies. This is confirmed by the fact that illnesses of people elicited by their contacts with foxes are noted predominantly in the country's European part<sup>6</sup>.

The revealed features of the distribution, population density, biocenotic contacts, and degree of synanthropization of wild predators of the canine family are responsible for the territorial distribution of rabies. Thus, in the last 30 years (1960-1989) only 11 percent of all recorded cases of rabies in animals were in Siberia and the Far East, which make up 75 percent of the territory of the RSFSR.

### Conclusions

1. "Retention" of the pelts of wild canines in the population of all areas of the RSFSR was found to be uniform, which makes it possible to use official hunting statistics for comparative analysis of the distribution and dynamics of the abundance of these predators.
2. A unified cartographic approach was used to study the population density distribution of the fox, wolf, raccoon dog, corsac and jackal on USSR territory. A cartogram of

the combined density of the populations of the principal natural hosts of the rabies virus was plotted for this region for the first time. It was shown that only in some regions of the country do several species of these predators occur together as larger populations and that such places exhibit a mosaic pattern.

3. Landscape features are responsible for the particular territorial distribution, population density, biotopic distribution and biocenotic contacts of Canidae, and the aggregate influence of these factors determines the features of the existence of natural rabies foci in space. In the USSR, regions with a higher risk of rabies are characterized by concentration of three to five species of canines within a single open area, including an agriculturally developed one, creating an elevated combined density and larger absolute population size. The intensity of natural epizootics decreases in mountain conditions. In a number of regions of Russia, and apparently of Western Europe, rabies foci may be maintained due to a high population density of the fox alone.

4. A negative correlation was established between the distances between the litters of carnivores and their population density. It was shown that the possibility of biocenotic contacts among predators is directly related to the latter indicator. It was revealed that the probability of intra- and interspecific contacts among Canidae and the degree of synanthropization of wild canines vary in different regions of the country, and are adequate to the level of rabies morbidity among the animals. These factors may be viewed as additional ecological parameters characterizing a natural focus of rabies infection.

5. This study of the distribution of Canidae was laid at the basis of a classification of natural foci of rabies infection, and it contributed directly to epidemiological zonation of the RSFSR with respect to rabies.

6. Comparative analysis of the biology of predators in the canine family explains both epizootological and epidemiological features of the function of natural rabies foci, and it is the conceptual basis for studying establishment of the rabies virus in space and changes in its occurrence over time.

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**Virus Collection Stolen From Sukhumi Laboratory**  
93P60033A Moscow KOMSOMOLSKAYA PRAVDA  
in Russian 23 October 92 p 4

[Article by EL MUNDO (Spain) correspondent D. Polikarpov, special to KOMSOMOLSKAYA PRAVDA, Sukhumi: "What Monkey Can Stand up to a Guardsman With A Machine Gun?"]

**[Text] Famous Sukhumi Nursery Robbed. Plague and Cholera Viruses [sic] Stolen**

A guardsman with a "Kalashnikov" in his hands, stood leaning against a tree and looked toward the mountains where the front lies. On his shoulder sat a small, thin monkey. The little beast's eyes were frightened and sad. On the way back to town, our "chauffeur"—a well-known Sukhumi doctor, said, without turning his head, "A little monkey from the nursery. Previously the guardsmen had a lot of them, but they all died: there was nothing to feed them."

Sukhumi residents always had reason to be proud of their city. But it contained two objects of note which no self-respecting tourist could fail to acquaint himself with: the botanical garden and the monkey nursery.

Scientists of many countries knew of the later's existence—it was there that the first monkeys to fly in space were trained. But what was of interest to science was not so much the planet's largest colony of what, according to some information, are our closest relatives, as the USSR Academy of Medical Sciences Institute of Experimental Pathology and Therapy, which operated on the base of the nursery and which was without analogue.

The institute, which had a very rich collection of viruses, studied the characteristics of their effect on the living organism. More specifically, on monkeys. In some laboratories, as the result of numerous experiments and observations the rarest medicinal preparations were created and approved. There existed a department which studied oncological diseases and conducted a search—claimed to be successful—for a vaccine against AIDS. Several of the institute's employees claim that people from the Russian Military Biological Laboratory worked in the vicinity, in a civilian building. Apparently it [the Russian Military Biological Laboratory] was successfully evacuated.

Today in Sukhumi, time is divided into "before the war" and "after." Before the war they wanted to build the world's first monument to the monkey here. Before the war they were planning to cut the staff. Now there is no one to dismiss: the Sukhumi monkey nursery no longer exists. Neither the people nor the monkeys.

"The guardsmen came here in the first days of the war," recounts the institute's translator, who asked not to be named. "They lugged off everything that could be carried. When nothing was left, they began to take the monkeys with them. People tried to explain to them that many animals were infected and as a result would die in their possession. Then the guardsmen began to shoot the monkeys right in the cages."

Most of the institute's employees were successfully evacuated. Their director, academician Boris Lapin, didn't suffer either. As early as 1989, when the first signs of the coming conflict appeared, he began to create a branch in Russia. The First Institute of Medical Primatology in Adler [city

located on the Black Sea, south of Sochi, in Krasnodar Kray, Russia] now continues part of the experiments begun in the Sukhumi Center. But, as Lapin himself thinks, to make up for what was stolen from the nursery would take at least several years.

The marauders carried off all the latest electronics and tore up the documentation. Of the institute building, only the walls remain. Of the three thousand monkmeys that lived in the nursery, now fewer than half are left. Even during the shootings some employees who had remained in the city went to the institute and tried to save the lives of their charges. But soon it became hard to find a crust of bread even for a human in Sukhumi.

The monkeys proved to be less hardy than the people. They did not know what hunger was and quietly died in their cages. Their former "comrades" were carried off by Georgian soldiers as trophies. They say that on the Tblisi market the asking price for one monkey from the nursery was 25,000 rubles.

But the worst was yet to come. On one of the nights after the armed men's next visit, the collection of viruses disappeared from the laboratory. According to the specialists' estimate, if some of them were to get into the city's water system, they could cause an epidemic of such diseases as plague or cholera. Of greatest concern, of course, is the work of the military laboratory. It is possible that not everything was evacuated, and since no one knows what the military doctors were studying, it is impossible to evaluate the degree of risk. Only one thing is clear: it is possible that someone, without suspecting it himself, holds in his hands the lives of many thousands of people.

**Ukrainians Manufacture 'Laser Shower'***927C0530B Kiev GOLOS UKRAINY in Russian  
9 May 92 p 12*

[Article by Dmitriy Desyatnikov, under the rubric "Economics": "They've Brought Forth a Laser Shower"]

[Text] That a laser can be used to treat many diseases is a medical fact. But not all of the medical possibilities of the laser are being used yet. The ability of a laser beam to penetrate tissue, for example, remains very low—something like one and a half or two microns. Ukrainian inventors have solved that problem and have received a patent here and patents in several developed countries. The new device is being sold to the FRG, Yugoslavia, Syria, and, of course, the CIS countries.

The principle of action of the device is very simple: the therapeutic properties of the laser are combined with the beneficial effects of an ordinary shower. As a result, the effectiveness of the procedures has grown manifold. And the most essential thing here is that the general director of the introducing scientific-production association Infid, Arnold Ryazanov (there are several hundred such inventions in his curriculum vitae), had no problems with the introduction of the device. The co-developer of the medical theory was Col V. Popov, a professor at the Okruzhnyy Military Hospital, and consequently, the design is something truly needed by doctors. As for the device itself, it's all very simple apparently: get a standard laser, manufacture peripherals and a scanner for it—and you're ready to treat.

"The results are very promising," says Prof Popov. "I'm not even talking about the complete absence of problems with its application—everything is even going well today with our production. And not just with the production of the laser. I give a paper at a science conference, for example, and three days later I'm visited by the representative of some enterprise or institute, who is asking, 'What were you proposing to develop?' Was it conversion? As for this project, the main sponsor was Ukrinbank, so we managed to avoid even the financial problems."

This kind of activity is nothing new for the hospital. Almost the entire technological and technical flourishing of the hospital is based on a unique kind of barter. Enterprises provide the doctors new equipment, and the doctors provide the enterprises high-level treatment for their workers. As for the laser shower, more than 500 patients of the main contingent of the hospital, plus 150 cost-accounting patients, pass through it every year.

Thus, if the example of the development and introduction (and the use for the good of people) of this invention alone is indicative, we are not being threatened with technological backwardness.

**New Biotransport Method***927C0530G Tashkent PRAVDA VOSTOKA in Russian  
28 May 92 p 4*

[Article picked up from Uza wire service: "Natural Biotransporter"; first paragraph is source introduction]

[Text] The drug is delivered exactly as intended—right to the area affected by the disease—by the biocapsules proposed by the specialists of the Institute of Biochemistry of the Uzbekistan Academy of Sciences and the Scientific Research Institute of Endocrinology.

Together, scientists and medical professionals have developed a technology for manufacturing those unique drug carriers that have targeting action.

Medications taken by individuals are usually disseminated throughout the entire body, sometimes having an unfavorable effect on the individual. Medicinal substances contained in biocapsules penetrate cells easily, and their concentration in a given organ only is ensured. This area represents one of the pressing problems of modern medicine that the scientists and medical people have solved. The biotransporter they have proposed makes it possible to lower the dose of the drugs and, at the same time, increase the therapeutic effect, while eliminating the possibility of allergic reactions.

The capsules themselves, of biogenic origin, are similar to the natural cell membranes in terms of composition, and they are not toxic.

**Connifer-Based Drug To Treat Radiation Effects***927C0530J Moscow LESNAYA GAZETA in Russian  
25 Jun 92 p 8*

[Article by LESNAYA GAZETA correspondent P. Dubynin, Khakassia: "The Fir Tree Against Radiation"]

[Text] Scientists of the Tomsk Scientific Research Institute of Biology and Biophysics have discovered that [fir] needles have the ability to lessen the effects of radiation. The joint-stock company Abatom, located in the capital of Khakassia, has begun setting up the manufacture of a new drug. A plant built especially for that is being readied for start-up. It has an output capacity of 5 tons of Abisiba a day.

**Improved Cardiac Surgery Technique***927C0530K Moscow IZVESTIYA in Russian 9 Jun 92  
Morning ed p 8*

[Article by Lidiya Ivchenko: "Scalpel-less Operation"; first paragraph is source introduction]

[Text] At the A. V. Vishnevskiy Institute of Surgery, unique operations—sans scalpel—were the first such operations performed in our country; they were for valvular disease in 11 pregnant women suffering from mitral stenosis. Seven of the women were in extremely serious condition, and the intervention was done on an emergency basis, for life-threatening indications.

Getting ahead of myself, let me say that all the women later gave birth to healthy, normally developing children. A staff member of the department of endovascular surgery who operated on them, L. Kokov, has photographs of the grateful moms. "My madonnas," jokes Leonid Sergeyevich [Kotov], as he looks at the portraits of the young women with babies in their arms. "Without the operation, they could hardly have survived..."

Stenosis of the mitral valve is a rather widespread heart disease that often occurs as a result of rheumatism, but can also be congenital. As a result of the disease, the orifice of the valve narrows, and blood has a hard time passing through the heart. The heart's work is disrupted, with all the attendant consequences. Internal-medicine therapy is not very effective, since it doesn't eliminate the main cause; so the only technique for eliminating the problem is felt to be surgery. But what does it mean to perform a complicated, body-cavity operation—i.e., opening the chest and the heart, using heavy anesthesia, and all the other accompanying factors—on a pregnant woman? It means, in that situation, her life is at stake, not to mention her motherhood. And so the true salvation here turned out to be X-ray endovascular operations—which are low-trauma operations that do not require deep anesthetization or cutting open the chest. Manipulations are done with a dilational catheter—a special instrument in the form of a tube with a balloon on the end. In its deflated, “nonworking” condition, the balloon is minute, no more than 2-2.5 mm in diameter, and easily goes into a vessel. But when it is filled with liquid, it stretches out to 30-32 mm and eliminates at the desired spot any obstacle in its path. Man, fortunately, is built such that all pathological accretions are destroyed first; the cusps, however, remain unchanged, and their function is restored as soon as blood-flow resistance disappears. The operations are performed under dual control—X-ray and endocardiographic. That makes it possible in a closed heart to estimate to a millimeter how much the mitral orifice has changed.

“We can clearly see the body's response to the elimination of the blockages,” explains the head of the department, Prof Yu. Volynskiy. “Sometimes we can see the changes right on the operating table. Sometimes the patient can't even lie down, because of pulmonary edema, and he has to be operated on while he's in a semireclined position, and after just a few minutes the rales are gone, and the breathing is normalized.”

Endovascular surgery in recent years has become very widespread. The balloon catheter has been used to expand narrowed vessels of the leg, the digestive tract, the bile duct channel, and renal arteries. Relatively recently, the technique began to be used in cardiology, too. The true innovator here were medical people from the St. Petersburg Military Medical Academy, Prof. V. Silin and Dr. Med. Sci. V. Sukhov. Building on the experience of foreign doctors, they developed their own instrument and their own surgical technology, which turned out to be simpler and more effective. If foreign specialists are able to expand the mitral orifice one and a half to two times its size, the Silin-Sukhov technique can expand it 3-4 times its size. And the balloon in the instrument they designed is much stronger than balloons used abroad and can withstand a pressure of eight atmospheres. The surgeons at the Vishnevskiy Institute have taken their technique into their armamentarium.

The advantages of this sparing, low-trauma treatment technique that is incomparable in terms of cost are obvious. In that connection, is there still a need for the traditional, serious heart operations?

“Needless to say, we couldn't manage without them,” explains the director of the institute, Russian Academy of Medical Sciences Academician V. Fedorov. “Although a good many patients don't have to have them now. X-ray/endovascular intervention is needed in those cases in which the valvular disease in not complicated and the functions of the other organs have not been disturbed because of the poor work of the heart. But there are a lot of patients in whom the cusps are damaged by, for example, calcinosis—they're full of stones, and only radical surgery can help. The condition of the patient may be so serious, however, that he simply couldn't make it through such surgery. Endovascular surgery, then, will provide temporary improvement, partially eliminating the valvular disease. And with time, when the body's activity becomes relatively normalized, a decision can be made about the serious surgical intervention. That is, thanks to what our St. Petersburg colleagues have developed, it is possible to help those who, perhaps, couldn't have been helped before. We are contributing our part to the development of the technique; specifically, we have begun to get rid of cardiac problems in pregnant women. Now we need to go farther yet.”

#### **New ‘Ferrothermy’ Technique of Cancer Treatment**

927C0530L Moscow TRUD in Russian 6 Jun 92 pp 1-2

[Article by V. Golobachev, Yu. Dmitriyev, special correspondents for TRUD: “Two-Hundred Eighty-Nine Lives Given Back: In the Trying Battle Against the ‘Disease of the Century,’ There Appears To Be a New Ray of Hope”]

[Text] Cancer is the most dreadful disease of the century. And now a new ray of hope has flashed, like a beacon in the night. We're not talking about merely a new idea being advanced by Russian scientists, or about experiments—there are already people cured of cancer! Cured not by healers, when it's impossible to determine what the individual was ill with and how he was cured, but in special clinics, where there are histories of illnesses and research results.

All the same, we went back and forth about it before we decided to tell about the technique. We feared a sensationalism that nobody needed, a lot of noise. We also thought about something else: what kind of response, what kind of alarm, what kinds of hopes would the report cause among cancer patients. And what is especially sad is that it is virtually impossible to render the broad-scale care to everybody who needs it today (we'll pause on that in more detail a little later). And yet, we reached the conclusion that someone had to tell about the technique: to get the public's attention, to help get sponsors—in a word, to open a broad path to the invention. Of course, one can't say today that the new technique is a panacea for all cancers. Research is continuing, and some unexpected turns and unknown factors may be identified; but what has already been accomplished is very impressive.

Anyway, enough of the “introducing”—let's move to the essence of the technique, whose developers are the authoritative inventor and scientist V. F. Gudov, the director of the Scientific Research Institute of Diagnostics and Surgery

Prof. V. P. Kharchenko, the chief oncologist of Nizhegorod Oblast (formerly Gorky Oblast) Prof N. Ye. Yakhontov, and a number of other specialists. Officially, the technique is given this way: "Technique for treating malignant neoplasms with ferromagnetic hyperthermy." In simpler, layman's terms, here's what it's about.

*Cancer cells are known to perish when kept at a temperature of 43.5° for two hours. Healthy cells remain viable when heated to a temperature of 45.5°. A simple technique for getting rid of this serious illness would seem to be to heat the body up to 43.5°, and two hours later not a single cancer cell would be left in the body. But such a technique, seemingly so simple and effective, is, unfortunately, completely unacceptable. A uniform elevation of body temperature is virtually impossible. The subcutaneous fatty layer, for example, heats up 17 times faster than do the muscles. That means that healthy cells die. General heatup of the whole body to the critical temperature of 43.5° leads, more often than not, to the death of the patient. It must be said that there have been attempts to treat with that technique, but they ran into a dead end.*

The developers of the new technique took a different tack. Why heat up the entire body when it would be better to raise the temperature of just the place where the cancer cells are. In fact, they also tried to do that earlier, with an ultrahigh frequency field. But they managed to heat the tissue to only a depth of one and a half to two centimeters. And beyond that, the temperature steadily fell: 41°, 40°, 39°, 38°. And things only got worse. After all, at 38-40°, the growth of the cancer cells does the opposite—it accelerates. The researchers managed to overcome that barrier.

Into the tumor, they introduce microparticles of iron that are concentrated on the surface of the cancer cells. And if those iron particles are heated with a high-frequency field, the temperature of the place where the malignant neoplasm is located can be elevated uniformly. The result is sensational: Up to 100 percent of the cancer cells die in the area where the ferromagnets were inserted.

Simple? Well, how can we put it? In words, it's fairly simple to do; in practice, it wasn't all that simple. It took thousands of experiments on animals, research on the cellular and molecular levels, and endless tests.

*The little particles of ultrapure iron are microns in diameter. They are so small that a granule can't be seen with the naked eye. And some of them are simply fantastically small—smaller than a micron across. They are measures in angstroms.*

*So the ferromagnetic material—or more precisely, the special solution in which the iron dust particles are uniformly mixed—is introduced with a syringe right into the malignant tumor or into the blood vessels (and then the solution reached the cancer cells by way of the vessels). Powerful magnets are used to keep the iron particles in the desired place. The particles can be moved by shifting the magnetic field and then moved back.*

Usually, the tumors and the metastases are visible on the X-ray, and the magnets are set up near that part of the body.

But what if the tumor hasn't formed yet and the cancer cells are not visible on X-ray? It turns out that the ferromagnetic material introduced into the body helps to find them. The iron particles "stick" to the surface of the cancer cells, as it were. The affected sectors become quite visible on the X-rays. Thus, the new technique is not only therapeutic, but also diagnostic, and—what is very important—it is extremely effective in the early stages of disease.

Such is the essence of the technique. The picture, as we can see, is very impressive. But skeptics could ask this (and rightly so): On paper, everything seems fine in theory, but how is it in practice? That's a fundamental question. And here is where the most weighty argument in favor of the technique can be cited. It is the first practical results that foster optimism. And although the developers of the technique plead that there "shouldn't be any fanfare, because it's still a little early," the fact is that in 289 individuals with malignant neoplasms, no cancer cells were found after ferromagnetic hyperthermy sessions. That represents a 90-100 percent cure rate among the selected patients. It's a phenomenal result!

"You probably chose patients with the simplest forms of the disease, right?" we asked V. Gudov.

"At first, yes," he answered honestly. "But then we chose anyone who didn't have contraindications (note that treatment with the ferromagnets is not conducted if, say, the metastases have gone into the brain or if, in addition to cancer, the patient has a serious form of hypertension, which wouldn't allow introducing the iron-particle solution into a vein). If there were no contraindications, we took any patient, even the most hopeless, as it were. Breast cancer, melanoma, various forms of sarcomas, pancreatic cancer. The treatment in all cases went successfully. And we also exposed kidney and liver cancers to ferromagnetic hyperthermy, and, as subsequent painstaking examinations showed, the cancer cells there were also killed."

The treatment was performed in oncology departments of clinics in Moscow, Nizhny Novgorod, and St. Petersburg. The figures from the medical reports are impressive. A total of 114 individuals were rid of breast cancer, 30 were rid of soft-tissue sarcoma, 66 of melanoma, 34 of skin carcinoma, and 26 of kidney carcinoma. The primary research center is in the Moscow Scientific Research Institute of Diagnostics and Surgery. The center conducts treatment, as well as research on a molecular level and immunological and electron-microscopy research—in a word, the entire spectrum of necessary work.

As with any revolutionary breakthrough in science, the technique of "ferrothermy" is steadily finding ever newer applications in the treatment of patients. Here is one of them: Magnetically controlled microcapsules can deliver drugs to any part of the body through the blood vessels—to precisely the focus of affliction, and not just for oncological diseases.

Another possibility: antibodies are "attached" to a microcapsule, and that "projectile" is guided straight to, say, cancer cells or cells infected with the AIDS virus. "Bodies" and "antibodies," we know, attract each other and enter

into reaction. And then the cancer cells or the dangerous AIDS virus is destroyed. That is, in fact, still in the future, but the model developed by the scientists looks to be entirely feasible.

Today, the ferromagnets have found broad application in the treatment of surface and deep suppurative wounds and trophic ulcers, as well as in oncology.

All the developments we have named, it should be noted, already have gone through some degree of probation. Ferromagnets were first used in clinics three years ago. And V. Gudov performed the very first experiments on animals back in 1965. In general, the lot of that individual is so unusual, has such unexpected and, at times, dramatic turns that you could write a very captivating book about him.

Gudov looks much younger than his 79 years; he's energetic and active and he deftly takes the morning subway cars by storm with the crowd; a month ago, he returned from his second trip to the United States. By the way, Vasily Fedotovitch [Gudov] doesn't have a medical diploma! He graduated from two technical higher educational institutions (aviation and electronics), completed four years of medical school, and also graduated from the two-year university for Marxism-Leninism. He is a doctor of technical sciences and a State Prize laureate. Interestingly, he defended his doctoral dissertation not at the Moscow Higher Technical School, where earlier they had accepted his candidate's dissertation with a hurrah, but at what would seem to be a totally unexpected place—the Second Medical Institute.

But there's no paradox there, for Gudov boldly injected himself into this most interesting bordering region of technology and medicine. In the 1940's, he created a unique apparatus that medical people at the time had only dreamt about—it involved instruments for the automated sewing of vessels, nerves, intestines, bronchi, and various other living tissues. That principle is used today in all the clinics of the worlds. At one international conference, it was noted that the creation of such an apparatus was among the 20 biggest inventions of the century.

The spectrum of Gudov's scientific interests is extraordinarily broad. He is involved in rockets and electronic vision, and he has received and put into practice nearly 30 patents.

In the last two decades or so, the primary business of his life has been the development of a new technique for battling cancers. It's significant that he has found similar thinkers in medicine, renowned oncologists who have joined the work, using the existing clinical base and modern equipment. Here, an invaluable contribution has been made by the Moscow professor and oncologist, V. Kharchenko; the Nizhegorod professor N. Yakhontov; researchers in St. Petersburg; and many others.

Official organizations, despite the strong counteraction of venerable opponents, have been unable to see the promise of the research. Almost 10 years ago, the chairman of the Science Council of the Ministry of Health of the former USSR, O. Gavrilov, wrote this to Gudov:

*"The Ministry of Health regards the study of the application of ferromagnets in medicine timely, promising, and in need of expansion of research. Minister S. Burenkov has given instructions to prepare a special comprehensive program involving the development of a technique the uses ferromagnets in the treatment of oncological diseases..."*

Such work, by the way, was also done in the Oncology Center, as well as in other laboratories.

Four years passed. In December 1986, the chairman of the State Commission on Inventions, I. Nayashkov, sends a letter to the Ministry of Health regarding an application for a patent filed by V. Gudov and colleagues:

*"A preliminary study has ascertained the worldwide novelty of this design and has identified the promise of its use for diagnosing and treating diseases of various etiology..."*

And finally, the program of research on the use of ferromagnets was approved by the vice-president of the Academy of Sciences, Ye. Velikhov; the president of the Academy of Medical Sciences, Academician N. Blokhin; and the individual already familiar to us, O. Gavrilov.

Special instruments and gear have also been developed in the Nizhegorod NPO Polet under the guidance of Director Ye. Belousov. Also taking an active part in the work have been specialists from the Central Aerohydrodynamic Institute (TsAGI), the Kurchatov Institute of Atomic Energy, and the University of the Friendship of Nations, etc.

On 28 December 1990, the presidium of the Science Council of the Russian Ministry of Health stated this once more:

*"Ferromagnetic hyperthermy is a fundamentally new and promising technique in the comprehensive and combined treatment of individuals with malignant neoplasms..."*

And again: develop the program...the Moscow institute is to be the head institute ...

After several more months (in March of last year), the Russian Council of Ministers, after rating the new technique highly, finally properly commissioned the ministries, departments, and Vneshtorgbank to develop what is essentially a national Russian program for implementing this promising technique for the treatment of cancer. But... Things for the time being went back and forth, various paperwork was done, the August putsch happened, and the program was forgotten in the bustle of new affairs .

As we can see, in recent years, everyone has been "for," everyone has given their approval of the new technique, have supported it, have recommended it. But the matter is not really going anywhere. Meanwhile, we could be saving not just 289 people, but thousands, or even tens of thousands. Today, the principal cause of the slide backwards is the most prosaic of all: no money—neither rubles nor hard currency. By the way, there wasn't even enough money to pay the necessary sum in the United States for patenting there the technique of V. Gudov and colleagues. Thank you to American businessman Robert Eckart [Ekkart], who contributed the money out of his own pocket. In November

of last year, U.S. Patent No. 5067952 was finally issued to the developers of the invention.

So what happened next? During the last visit to the United States in April of this year, V. Kharchenko and V. Gudov told American oncologists about the ferrothermy technique and about the results of its use. In the largest cancer center in the United States—Anderson Hospital (Houston)—and in clinics in San Francisco, American specialists listened to the Russian scientists with great attention. Back during the first visit to the United States, one American millionaire repropounded building in the United States a clinic for Gudov and his colleagues: Vasilii Fedotovitch turned it down.

And in the course of the April visit, the talk again got to cooperation in this most important sphere. Right now, the question is being addressed about the creation of a Russian-American partnership with limited liability—the Ferrothermy-Magnetics Ltd. corporation. The Americans are ready to initially invest \$3 million.

But they're not willing to do that without certain conditions. We think that the conditions are not all that beneficial to Russia. All the rights for the future sales abroad of licenses must, according to the conditions, go to the American partners. And they would be the ones apportioning our side a share of the revenues. Thus, our American companions would have actual control of the situation.

Not a particularly promising future. But what can be done?

You're thinking: Must the solution of this immense problem—the saving of people's lives—depend on the favorable disposition of economic calculations of some businessman? Or on some department? That can't be an aim that is worthy of the efforts of all the world community? But if that's so, wouldn't it be best to start the attack on cancer along that new, promising route under the aegis of the world's largest countries and the United Nations? That would seem to be the best path for a solution.

It's entirely possible that this problem, which is extremely vital to people on Earth, could be discussed during the forthcoming meeting between presidents B. Yeltsin and G. Bush in the United States. A victory over cancer would be the best gift to the population of the planet Earth.

Several years ago, Prof N. Yakhontov wrote this:

*"According to the data of a Japanese society of hyperthermy oncology, hyperthermy will be used for the treatment of 80-90 percent of oncological patients by the end of this century."*

So let's get closer to that time, instead of moving away from it. Russian and Moscow authorities could at least be of great help at this point by allotting the necessary space for a specialized hospital (by the way, there are suitable, unfinished buildings on Butlerov Street, next to Prof. V. Kharchenko's clinic). Of course, the best solution would be for the parliament and the government to adopt a national Russian

**program for combatting cancer on the basis of this new technique and to determine sources of financing.**

And there's still another possibility for getting the matter going: with the help of the people (and not just those in our country), **set up an international public fund** to support the new technique for treating cancer. Once the necessary funds are collected, a clinic could be built quickly and tens of thousands of lives could be saved. **The TRUD editorial office is ready to assume responsibility for setting up that public fund.**

And if the idea is supported by the readers, we will rise to a new level of practical realization.

### **Volgograd Oncology Dispensary To Become Center for New Cancer Treatment**

*927C0530M Moscow TRUD in Russian 2 Jul 92 p 1*

[Article by O. Pozdnyakova: "It Won't Be Just in Moscow That Cancer Will Be Treated"]

[Text] The publication in TRUD of the discovery of a new technique for treating cancer evoked an enormous response in the Volga Region.

When we write about the telephone calls and persistent pleas of people clutching at straws in search of their last hope, we write with compassion, apologetically—and that's all we can do. How else can we help? This time, however, events are unfolding differently. Cancer morbidity in the region is growing fast, among children as well. All that forced specialists of Volgograd to rise above the inevitable doubts and the skepticism about the new technique. Vasilii Khazov, the chief physician of the Volgograd Oncology Dispensary, and Andrey Kargiya, his deputy, were guided by the physician's duty and a sincere desire to help people when they expressed a desire to meet with a representative of the newspaper.

Then there was a phone call from the oblast health department. And there was a lot of interest there, too. We managed to quickly get in touch with Vasilii Fedotovitch Gudov by phone. Vsevolod Shchukin, the head of the oblast health department, asked Gudov this question without any introduction:

"Will you agree to set up a center for treating with the new technique here, at our oncology dispensary, which is one of the biggest in the CIS?"

The conversation was brief. The Volgograd people quickly agreed to a meeting with Gudov and left for Moscow.

"Our meeting with Kharchenko and Gudov was fruitful," the chief physician of the oncology dispensary, V. Khazov, said upon his return. "Volgograd's proposal to begin testing the new technique for treating cancer in our dispensary was accepted by them. We hope it will get under way as early as this fall."

**Oligopeptide Dictionaries for Identification and Localization of Functional Domain Boundaries**

937C0010A Moscow MOLEKULYARNAYA  
BIOLOGIYA, Vol 26 No 2, Mar-Apr 92 (manuscript  
received 05 Sep 91) pp 341-353

[Article by V.V. Solovyev and K.S. Makarova, Institute of  
Cytology and Genetics, Siberian Department, Russian  
Academy of Sciences, Novosibirsk; UDC 576.12:575.321]

[Abstract] Mathematical analysis was conducted on func-  
tional domain boundaries and domain localization based

on oligopeptide dictionaries covering amino acid  
sequences of various protein families. Studies on specific  
examples—GTP-binding domains of proteins EF-1 $\alpha$ , EF-  
Tu and Ras, DNA-binding homeodomains, H3 histones,  
and catalytic domains of tyrosine kinase—demonstrated  
that a bank of ca. 25 unprealigned dipeptides provides  
sufficient information for enzyme classification and  
domain site delineation. The error for domain boundary  
prediction did not exceed three to four amino acid residues  
in most cases. Figures 5; tables 5; references 16: 2 Russian,  
14 Western.

**'Batriden' Developed for Organ Transplants**

927C0530D Tashkent PRAVDA VOSTOKA in Russian  
23 May 92 p 2

[Article picked up from UzA wire service: "Into the Arsenal of the Medical Profession"; first paragraph is source introduction]

[Text] The republic's physicians have beefed up their armamentarium with an effective preparation, batriden, which is used in the transplantation of human organs and tissue. It was developed by staff members at the Institute of Bioorganic Chemistry of the Uzbekistan Academy of Sciences.

The medicinal preparation successfully underwent clinical tests at the problems research laboratory for overcoming tissue incompatibility at the Tashkent Medical Institute and the Republic Center for Kidney Transplants. It reinforces the effects of the transplantation considerably, makes it possible to counter infection more successfully, and does not cause any appreciable functional changes or side effects in the human body. In terms of many indicators, batriden surpasses other drugs with a similar spectrum of action.

The Institute of Bioorganic Chemistry of the Uzbekistan Academy of Sciences has also developed other promising drug preparations that are being widely introduced into medical practice.

**New Preparation 'Laprot' for Suppurative Wounds**

927C0530F Moscow NEZAVISIMAYA GAZETA  
in Russian 12 Jun 92 p 4

[Article by Yekaterina Uzeneva, under the rubric "Briefs": "The Preparation 'Laprot' Has Been Developed"]

[Text] The Moscow Gertsen Scientific-Research Oncology Institute has produced a new preparation called laprot. Unlike other preparations of its kind today, the new preparation is of organic origin, is absolutely biologically compatible with the human body, and is used for toxicoses of various kinds, for suppurative infections, and for various kinds of jaundice. For now, the substance has been developed for intravenous injection only, but other variations of it are possible.

Laprot is now in the testing stage, and the question of its production is at hand. According to the preliminary estimates of specialists, one million rubles are needed to put the preparation into production. Right now, however, neither the institute nor the former RSFSR Ministry of Health has the money to finance that.

**Liposome Ultrastructure: Formation of Interliposomal Connections**

937C0009B Moscow ANTIBIOTIKI I KHIMIOTERAPIYA  
in Russian Vol 37 No 2, Feb 92 (manuscript received  
15 Jun 91) pp 15-17

[Article by V.G. Zhukov, N.S. Gryaznova, E.Sh. Tursunova, R.M., Petyushenko and I.V. Belyavskaya, All-Union Scientific Center for Antibiotics, Moscow; UDC 615.451/234:547.953].07

[Abstract] Ultrastructural studies on liposomes prepared from lecithin:cholesterol:stearic acid (16.6:0.83:0.16 by wt.) revealed the formation of interliposomal connections seemingly analogous to bacterial pili. The observations were made on 50-400 nm liposomes loaded with insulin, amphotericin B, fluoroquinolone or aclarubicin. The tubular structures connecting the liposomes ranged from 100 to 500 nm in length and 20 to 50 nm in width. There was no apparent relationship between the enigmatic tubular structures and the liposomal contents. Figures 1; references 4: 2 Russian, 2 Western.

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**Antibiotic Sensitivity of Environmental Vibrio Cholerae O1 Isolates**

937C0009B Moscow ANTIBIOTIKI I KHIMIOTERAPIYA  
in Russian Vol 37 No 2, Feb 92 (manuscript received  
15 Jun 91) pp 20-23

[Article by A.B. Khaytovich, Ye.A. Vedmina, Crimean Antiplague Station, USSR Ministry of Health, Simferopol; Central Institute for Advanced Training of Physicians, Moscow; UDC 579.843.1.04:615.33].08]

[Abstract] An analysis was conducted on antibiotic sensitivity of 252 environmental isolates of serotype O1 Vibrio cholerae (73.1 percent Ogawa serogroup, 18 percent Inaba, 8.1 percent Hikoshima). The method of serial dilutions on solid media demonstrated that the Soviet strains were highly sensitive to tetracycline, chloramphenicol, gentamycin, erythromycin and rifampicin. The isolates were less sensitive to novobiocin and other aminoglycosides and least susceptible to beta lactam antibiotics. Individual strains (6.3 percent) were resistant: one to novobiocin, rifampicin and carbencillin, while 15 were resistant to kanamycin and novobiocin. Figures 1; tables 1; references 45: 25 Russian, 20 Western.

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**Multifactorial Analysis of Combined Management of Mouse Plague With Doxycycline and Agrobacter Peptidoglycan**

937C0009C Moscow ANTIBIOTIKI I KHIMIOTERAPIYA  
in Russian Vol 37 No 2, Feb 92 (manuscript received  
14 Nov 89) pp 28-33

[Article by A.V. Nikitin, L.N. Makarova, I.P. Fomina, L.P. Ivanitskaya, G.O. Popova, N.N. Vinidchenko, Ya.N. Korganov and L.Ye. Bodunkova, All-Union Scientific Center for Antibiotics, Moscow; Scientific Research Antiplague Institute, USSR Ministry of Health, Rostov-on-Don; UDC 616.98-579.842.23]-092.9-085.33-059: [615.275.4: 577.112.853]

[Abstract] Multifactorial analysis was conducted on the efficacy of doxycycline and Agrobacter radiobacter peptidoglycan in the prophylactic and therapeutic management of murine plague. The time-dose relationships vis-a-vis survival and longevity were assessed on 18-20 g outbred white mice infected subcutaneously with 1000 Y. pestis cells. The results demonstrated that in the prophylactic mode (using subtherapeutic antibiotic dosages) the survival

rate was improved, but not average longevity. In the therapeutic mode the survival rate reached 100 percent, along with significantly prolonged longevity. Mathematical modeling was instrumental in delineating optimum dosage combinations of both agents in the prophylactic and therapeutic modes for optimum survival and longevity and in identifying doxycycline dosage as the key factor affecting survival of the outbred mice. Figures 4; tables 1; references 5: 4 Russian, 1 Western.

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#### Opiate-Level Biochemical Antagonism of Cholinolytics and Cholinomimetics

937C0019A Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 54 No 6, Nov-Dec 91 (manuscript received 23 Apr 90) pp 14-16*

[Article by V.A. Zhila, G.N. Gatsenko and L.A. Gromov, Laboratories of Psychopharmacology and of Pharmacokinetics, Kiev Scientific Research Institute of Pharmacology and Toxicology, Kiev; UDC 615.217.32.015.23:615.217.34].015.4:612.822.1[547.95:547.943]

[Abstract] Outbred 190-220 g rats were used to assess the impact of intraperitoneal administration of cholinolytics and cholinomimetics on the levels of met- and leu-enkephalin and  $\beta$ -endorphin in the cerebral cortex and blood. The results showed that administration of 20-40 mg/kg of cholinolytics (atropine, brnactyzine, glypin) led to statistically significant ( $P < 0.05$ ) depression of the endogenous opioids. Treatment of the animals with 2.2-17.5 mg/kg of cholinomimetics (nicotine, arecoline, physostigmine) induced significant elevations in the cortex and generally less pronounced elevations in blood levels. These observations indicate that antagonism between these two

classes of pharmacologic agents occurs at the level of the endogenous opioids. Tables 4; references 3: Russian.

#### Antiarrhythmic Properties of Ethyl-3-(2,2-Dimethyl-2-Ethylhydrazine)Propionate Iodide

937C0019B Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 54 No 6, Nov-Dec 91 (manuscript received 15 May 90) pp 25-28*

[Article by N.A. Abdikaliyev, I.Ya. Kalvinsh and F.Z. Meyerson, Scientific Research Institute of Genral Pathology and Pathologic Physiology, USSR Academy of Medical Sciences, Moscow; Kazakh Scientific Research Institute of Cardiology, Kazakh SSR Ministry of Health, Alma-Ata; Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga; UDC 615.12-008.318-092.9-02:615.357:577.175822]-07]

[Abstract] Follow-up pharmacodynamic evaluations of ethyl-3-(2,2-dimethyl-2-ethylhydrazine)propionate iodide (EDIHYP) [sic], an acetylcholine analog, were conducted to further define its antiarrhythmic spectrum. Studies on 200-250 g male Wistar rats showed that pretreatment with an intravenous dose of 5 mg/kg of EDIHYP prevented  $\text{CaCl}_2$  (200 mg/kg, i.v.)-induced arrhythmia and death. Previous (30 min) administration of atropine (0.1 mg/kg, s.c.) had no effect on the antiarrhythmic activity of EDIHYP but counteracted salivation and lacrimation. In addition, EDIHYP had no effect on aconitine-induced extrasystoles, but in studies on chinchilla rabbits was shown to alleviate strophanthin-induced arrhythmias. On balance, these observations indicate that the antiarrhythmic activity of EDIHYP is due to direct or indirect inactivation of slow calcium channels. Figures 1; tables 2; references 7: 4 Russian, 3 Western.

**Health Code of Turkmenistan**

927C0526A Ashgabat TURKMENSKAYA ISKRA  
in Russian 1 Jun 92 pp 1-4

[Text] This Code determines the legal, economic, and social conditions of providing for the health and epidemiological well-being of the population, and implementing and defending the rights of citizens to a healthy environment, and other rights and legal interests of citizens associated with them.

**Section I. General Provisions****Article 1. Objectives of the Turkmenistan Health Code**

The Turkmenistan Health Code regulates relations in the area of providing for the health, epidemiological well-being and radiation safety of the population<sup>1</sup> for the purposes of preserving and strengthening the health of the people in the face of the unfavorable influence of environmental factors.

Relations associated with ensuring observation of the regulations and standards of environmental protection, labor protection, and industrial safety in the course of labor are regulated by special Turkmenistan legislation.

Relations associated with protecting the population from diseases common to man and animals and with ensuring the health and epidemiological well-being of the population in emergency situations are regulated by special legislation of Turkmenistan and this Code.

**Article 2. Health Legislation of Turkmenistan**

Turkmenistan health legislation consists of this Code and other legislative acts of Turkmenistan in this area.

The choice of the law by which to regulate public health relations with other states brought into being by ownership and business rights and by liabilities incurred from inflicting damage and from other property relations is determined in accordance with rules of Turkmenistan civil legislation.

**Article 3. Competency of Turkmenistan in Providing for the Health and Epidemiological Well-Being of the Population**

The following are within the jurisdiction of Turkmenistan in regard to providing for the health and epidemiological well-being of the population:

- 1) developing and adopting public health legislation and other normative acts of Turkmenistan;
- 2) determining the system and legal status of organs and institutions conducting state public health surveillance;
- 3) ensuring observance of Turkmenistan health legislation and monitoring its implementation through state organs, organs of local self-management, enterprises, institutions and organizations irrespective of form of ownership and management<sup>2</sup>, and citizens;
- 4) developing state and specific-purpose programs to support the health and epidemiological well-being of the population, approving and financing them, and monitoring their implementation;

5) introducing special conditions and schedules of labor, study, travel, and shipping in the territory of the state, directed at preventing the spread of infectious diseases and at eliminating them;

6) prohibiting people from living on territory dangerous to human life and health, and from conducting agricultural and other economic activity therein;

7) establishing the procedure for reckoning damages inflicted by a failure to observe health legislation and for compensating for them;

8) organizing material and technical support to organs and institutions conducting state public health surveillance;

9) coordinating the activities of departmental health and epidemiological services;

10) maintaining international cooperation with other states in the area of providing for the health and epidemiological well-being of the population;

11) coordinating and stimulating scientific research in the area of providing for the health and epidemiological well-being of the population;

12) creating material and other reserves with which to recover from epidemics, accidents, natural disasters, ecological catastrophes and other extraordinary situations dangerous to human life and health;

13) regulating other issues associated with providing for the health and epidemiological well-being of the population in accordance with the Turkmenistan Constitution and Turkmenistan legislation.

**Article 4. Competency of Local Organs of Government and Management in the Area of Providing for the Health and Epidemiological Well-Being of the Population**

The following are under the jurisdiction of local organs of government and management in the area of providing for the health and epidemiological well-being of the population:

- 1) coordinating and monitoring—within the limits of their competency—activities of enterprises, institutions, organizations and citizens concerned with their implementation of complex public health, hygienic and epidemic control measures, and with their observance of health legislation;
- 2) developing, approving, financing, and monitoring regional programs to provide for the health and epidemiological well-being of the population, and organizing implementation of state and specific-purpose programs pertaining to similar issues;
- 3) organizing efficient measures to prevent and eliminate infectious disease epidemics and mass illnesses and poisonings of people;
- 4) adopting decisions to impose and lift a quarantine or restrictive measures on their territory in the event of infectious disease epidemics and mass illnesses and poisonings of people;

5) providing for conditions allowing for exercise and defense of the rights of citizens and the interests of the society regarding the health and epidemiological well-being of the population;

6) carrying out, within the limits of the competency established by legislation, a policy of stimulating the activity of enterprises, institutions, organizations and citizens directed at preventing and eliminating the harmful influence of environmental factors on the human body, preventing diseases, and improving the hygienic conditions of the people's work and life.

#### Article 5. Principles Establishing Rights and Responsibilities

Rights and responsibilities foreseen by this Code are established on the basis of principles foreseen by Turkmenistan legislation, as well as by the actions of state organs, organs of local self-management, enterprises, institutions, organizations, and citizens which are not foreseen by law but which generate, in view of the general principles and spirit of health legislation, rights and responsibilities associated with providing for the health and epidemiological well-being of the population.

In accordance with this, rights, and responsibilities concerned with providing for the health and epidemiological well-being of the population arise:

- 1) out of administrative acts of public health surveillance organs;
- 2) owing to damages inflicted upon the health of citizens, and equally so, owing to infliction of damage by public health organs and institutions;
- 3) owing to events which the law associates with the onset of changes or termination of relationships regulated by this Code;
- 4) owing to other actions of state organs, organs of local self-management, enterprises, institutions, organizations, and citizens.

#### Article 6. Exercise of Rights and Execution of Responsibilities

Rights foreseen by this Code are protected by law, with the exception of cases in which they are exercised in a manner conflicting with their intent.

In exercising rights and executing responsibilities, state organs, organs of local self-management, enterprises, institutions, organizations, and citizens must observe the laws, and they must not infringe upon the rights and legal interests of other state organs, organs of local self-management, enterprises, institutions, organizations and citizens.

#### Article 7. Protection of Rights

Rights foreseen by this Code are protected by the court, by an economic court [khozyaystvennyy sud] or, if the parties so agree, a court of arbitration through:

- 1) recognition of rights;

2) restoration of the situation that existed prior to violation of a right, and suppression of actions violating the right or creating the threat of its violation;

3) a sentence requiring execution of responsibilities in physical terms;

4) collection of damages and forfeits;

5) termination or change of legal relations;

6) recognition of a normative act of state organs or of organs of local self-management to be invalid when it conflicts with legislation;

7) other means foreseen by legislative acts.

Protection of citizens' rights foreseen by articles 9-12 of this Code is provided by state organs and organs of local self-management empowered to do so or by the court in accordance with Turkmenistan legislation.

Rights in the area of providing for the health and epidemiological well-being of the population are protected in accordance with this Code and Turkmenistan legislation.

#### Article 8. The Health and Epidemiological Well-Being of the Population and the Principles of Providing for Them

The well-being of the population from the standpoint of health and epidemiology is defined as a state of health of the population and of its environment in which dangerous and harmful influences of the environment's factors upon the human body are absent and the conditions are favorable for the population's life.

The health and epidemiological well-being of the population of Turkmenistan are provided for:

1) by implementing state, regional, and local programs to strengthen the population's health, to prevent diseases, and to improve the environment of the individual and the conditions of his vital activities;

2) by hygienic and epidemic control measures implemented by state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens as an inherent part of their activity, and by observation of public health regulations and norms and hygienic standards;

3) by establishing the rights and responsibilities of state organs, organs of local self-management, enterprises, institutions, organizations and citizens in this area;

4) by combining the economic interest of enterprises, institutions, organizations, and citizens (foreign citizens and persons without citizenship) in observing health legislation of Turkmenistan with their liability for violations of health law;

5) by a system of state and departmental public health surveillance, and by industrial and public surveillance over observance of health requirements, as well as by implementing hygienic, epidemic control, and antiradiation measures;

6) by observing legislation in this area and creating a complex of organizational, legal, and legislative measures

directed at implementing the rights of citizens to health protection and providing guarantees of these rights;

7) by determining measures of responsibility for violation of public health norms and regulations and hygienic standards;

8) by raising public health awareness in the population.

**Section II. Rights and Responsibilities of Citizens, State Organs, Organs of Local Self-Management, Enterprises, Institutions and Organizations in Providing for the Health and Epidemiological Well-Being of the Population**

**Article 9. The Right of Turkmenistan Citizens to a Favorable Environment**

Every citizen of Turkmenistan has the right to a favorable environment which does not negatively influence the health of the present and future generations and which ensures their health and epidemiological well-being.

**Article 10. The Right of Turkmenistan Citizens to Acquisition of Information**

Every citizen of Turkmenistan has the right to acquire, directly or through his representative, public organizations, the mass media or other legal means, all available dependable information, free of charge, on morbidity, on the epidemiological and radiological situation, on the state of the environment and its influence on public health, on results of hygienic and other special expert evaluations, and on all existing public health norms and regulations and hygienic standards, except in cases in which such information is considered by legislative acts of Turkmenistan to be information containing state, official or commercial secrets.

**Article 11. The Right of Turkmenistan Citizens to Participate in Preparation of Decisions Which, If Implemented, Will Have an Influence on Public Health and the Environment**

Every citizen of Turkmenistan has the right to participate, directly or through his representative, public associations or other means, in fulfilling and monitoring the fulfillment of decisions which are adopted by organs and officials both on a group and an individual basis, and which, if implemented, will influence public health and the environment.

**Article 12. The Right of Turkmenistan Citizens to Compensation for Damages to Their Health**

Every citizen of Turkmenistan has the right to full compensation for damages inflicted upon his health by physical, biological and other forms of influence of environmental factors, food products, and drinking water.

**Article 13. The Rights of State Organs, Organs of Local Self-Management, Enterprises, Institutions and Organizations**

State organs, organs of local self-management, enterprises, institutions, and organizations have the right:

1) to obtain, including on a contract basis, information from the corresponding state organs on the epidemiological situation, on the state of the environment, on morbidity within the population, and on public health norms and regulations,

and hygienic standards currently in effect, except in cases foreseen by Article 10 of this Code;

2) to participate with state organs and organs of local self-management in developing decisions and programs providing for the health and epidemiological well-being of the population.

**Article 14. Responsibilities of State Organs, Organs of Local Self-Management, Enterprises, Institutions, Organizations, and Citizens**

State organs, organs of local self-management, enterprises, institutions, organizations, and citizens are obligated:

1) to observe public health norms and regulations and hygienic standards approved in accordance with the established procedure;

2) to implement hygienic, epidemic control, and antiradiation measures directed at providing for the health and epidemiological well-being of the population, preventing and reducing morbidity, and preserving, improving, and restoring the environment;

3) to carry out the acts of officials conducting state public health surveillance;

4) to provide dependable and complete information to organs and institutions conducting state public health surveillance on the public health and epidemiological situation.

**Article 15. Responsibilities Concerned With Supporting the Rights of Citizens to Health Protection, a Favorable Environment, and Information**

State organs, organs of local self-management, enterprises, institutions, and organizations are obligated:

1) to ensure observance of health legislation of Turkmenistan currently in effect and established public health norms and regulations and hygienic standards, and to monitor their fulfillment;

2) to carry out their activities in such a way as to support or improve the health of their workers and the population, and take all possible steps to prevent the unfavorable influence of the environment upon the individual;

3) to notify organs and institutions of the state public health and epidemiological service of Turkmenistan, promptly and in accordance with the established procedure, on accidents, shut-down of production operations and violations of production processes jeopardizing the health and epidemiological well-being of the population;

4) to act on the conclusions, resolutions, and orders of officials conducting state public health surveillance;

5) to implement measures of material stimulation directed at raising the interest of labor collectives and individual workers in observing the requirements of Turkmenistan health legislation and public health norms and regulations and hygienic standards;

6) to disseminate hygienic knowledge and to provide hygienic training and education for the population directed at raising the people's public health awareness and encouraging a healthy way of life;

7) to ensure conditions allowing for participation of citizens in preparing, adopting, fulfilling and monitoring the fulfillment of decisions of corresponding state organs, organs of local self-management and officials, implementation of which is associated with an unfavorable influence upon the health of the population or the environment;

8) to furnish all available dependable information to citizens, their representatives and public associations when demanded by them, in accordance with articles 10 and 13 of this Code;

9) to ensure exercise of the rights of citizens and other subjects of legal relations foreseen by articles 9-13 of this Code.

#### **Article 16. Responsibilities of Writers of Technical Standards**

State organs, enterprises, institutions, organizations, and citizens writing technical standards are obligated:

1) to submit, to the Chief State Public Health Physician of Turkmenistan for coordination, technical standards in the event that established norms, regulations and standards are absent or deviations are made from them, as well as standards on new types of raw and other materials, substances, articles, and other products of the national economy, and the procedures of their manufacture;

2) to submit, to the Chief State Public Health Physician of Turkmenistan and the Turkmenistan Ministry of Public Health for approval, technical standards on medical immunobiological preparations;

3) prior to introduction of new types of raw and other materials, substances, articles, and other products of the national economy and the procedures of their manufacture, to provide for development of substantiated proposals on standards directed at providing for the health and epidemiological well-being of the population, as well as the methods of monitoring their concentration in environmental objects, and to submit them for approval to the Chief State Public Health Physician of Turkmenistan;

4) to include the requirements of public health norms and regulations and hygienic standards in standards, specifications, construction norms, and regulations, and other technical standards undergoing review and those being written for the first time;

5) to submit, to organs and institutions conducting state public health surveillance, the necessary information to provide for comprehensive evaluation of the properties of substances and materials, the safety of manufacturing processes, and the substantiations for public health, hygienic, and epidemic control measures.

#### **Article 17. Responsibilities Associated With Planning and Construction**

State organs, enterprises, institutions, organizations, and citizens are obligated to observe the norms, regulations, and standards directed at providing for the health and epidemiological well-being of the population when planning, locating, building, rebuilding, modernizing, and reequipping enterprises, their start-up complexes, buildings, and structures, in the long-range build-up and location of population centers, health resorts, industrial and agricultural facilities, water supply, sewer and waste treatment systems, hydraulic engineering structures, transportation resources, production processes, articles, equipment, instruments, and other objects.

The procedure of coordinating with organs and institutions of the State Health and Epidemiological Service on plans for construction, reconstruction, modernization, and reequipping is determined in accordance with Turkmenistan legislation.

#### **Article 18. Responsibilities Associated With Placing Facilities Into Operation**

Organizations acting as clients (builders), operating organizations, general contractors, other organizations and citizens are obligated to observe public health norms and regulations and hygienic standards regarding the health and epidemiological well-being of the population when placing facilities into operation after their construction or reconstruction is finished.

#### **Article 19. Responsibilities of Officials Associated With Accepting Facilities for Operation**

Chairmen and members of state and workers' acceptance commissions, including representatives of state public health surveillance organs and institutions, are obligated to accept facilities for operation after their construction or reconstruction is finished only if they comply with the requirements of public health norms and regulations and hygienic standards, and in their absence, in accordance with approved planning documents.

#### **Article 20. Responsibilities of Maintaining and Operating Premises, Buildings, Structures, Equipment, Territory, and Transportation Resources**

Enterprises, institutions, organizations, and citizens are obligated to provide for the maintenance and operation of productive and personal sanitation facilities, work stations, public buildings, complexes and structures, residential buildings, production and other equipment, territory, and transportation resources in accordance with public health norms and regulations and hygienic standards and other documents containing requirements regarding the health and epidemiological well-being of the population.

#### **Article 21. Responsibilities of Using, Salvaging, Decontaminating and Burying Chemical Substances, Biological Agents, and Materials**

Enterprises, institutions, organizations, and citizens are obligated:

1) to observe public health regulations, standards and requirements contained in other documents concerned with the health and epidemiological well-being of the population

when using, salvaging, decontaminating, and burying chemical substances, biological agents, and materials;

2) to use new chemical substances, pesticides, biological agents, and materials, polymers, plastics, perfume, and cosmetic products and other resources only after they have undergone toxicological and hygienic evaluation, after hygienic standards are established, and with the permission of the Chief State Public Health Physician of Turkmenistan, and as regards medical immunobiological preparations—in accordance with the established procedure and with the permission of the Turkmenistan Ministry of Health.

#### **Article 22. Responsibilities of Providing for Radiation Safety**

State organs, enterprises, institutions, organizations, and citizens are obligated to observe the norms of radiation safety, and the public health regulations regarding work with radioactive substances and other sources of ionizing radiation, as well as requirements contained in other technical standards regarding radiation safety when extracting, acquiring, manufacturing, using, processing, transporting, storing, salvaging, and burying radioactive substances and other sources of ionizing radiation.

All cases of violation of the requirements of radiation safety norms and public health regulations regarding work with radioactive substances and other sources of ionizing radiation are subject to special examination with the mandatory participation of officials conducting state public health surveillance.

#### **Article 23. Responsibilities Regarding Occupancy of and Residence in Living Spaces**

State organs of government and management, enterprises, institutions, organizations, and citizens making living spaces available for residents are obligated to fulfill existing public health requirements upon occupancy of these living spaces.

Occupancy of and residence in living spaces that do not meet existing hygienic standards are prohibited.

#### **Article 24. Responsibilities Associated With Producing, Transporting, Storing, and Selling Dietary Raw Materials and Food Products**

Enterprises, institutions, organizations, and citizens are obligated:

1) to observe biomedical requirements, public health norms and regulations and hygienic standards during the processing, transportation, storage, and sale of dietary raw materials and food products;

2) to use new food additives, specially introduced biologically active substances, new processes for producing dietary raw materials and food products, as well as packaging, polymers, and other materials coming in contact with dietary raw materials and food products only after they have undergone toxicological and hygienic evaluation, and with the permission of the Chief State Public Health Physician of Turkmenistan or his deputies.

#### **Article 25. Responsibilities Regarding Observation of Public Health Requirements on Household and Drinking Water Supply and on Places of Recreational and Personal Water Use by the Population**

State organs of government and management, enterprises, institutions, organizations, and citizens are obligated to ensure that the quality of water supplied by centralized household and drinking water supply systems corresponds to the requirements and state standards, and in the case of decentralized water supply, as well as in water basins, rivers, canals, and the seacoast, and in places used by the population for recreational and personal purposes—to the requirements of the corresponding public health regulations and norms.

#### **Article 26. Responsibilities Associated With Delivering, Selling, and Using Products Purchased Abroad**

State organs, enterprises, institutions, organizations, and citizens are obligated to observe the public health norms and regulations and hygienic standards effective in Turkmenistan when supplying, selling, and using raw and other materials, substances, articles and other products, and the procedures of their manufacture, that are purchased abroad.

#### **Article 27. Responsibilities Regarding Observation of the Conditions of Child-Rearing, Education, and Production Practice**

State organs, organs of local self-management, enterprises, institutions, organizations, officials, and citizens are obligated to provide for compliance with norms, regulations, and standards regulating the conditions of child-rearing, education, production practice, public health, hygienic and epidemic control regulations, the requirements of radiation safety and public health legislation associated with nutrition and working conditions, and with health and personal support and rest of children and juveniles in children's preschool and health-improvement institutions, secondary schools, vocational-technical schools, other institutions, and at enterprises.

#### **Article 28. Obligations Regarding Observance of Public Health Requirements on the Air of Population Centers and the Air of Work Areas and Places of Constant and Temporary Presence of People**

State organs of government and management, enterprises, institutions, organizations, and citizens are obligated to implement integrated measures directed at preventing contamination of the air environment by toxic substances, recovering from its contamination, and protecting it from the effects of physical factors having an unfavorable influence on human health.

The air of population centers and the territories of industrial enterprises, and the air of work areas in production and other spaces occupied by people must correspond to public health norms and regulations and hygienic standards.

#### **Article 29. Responsibility for Undergoing Medical Examinations**

In order to protect the health of the population, to prevent the spread of infectious and parasitic diseases, to prevent

occupational diseases, poisonings and accidents, and to ensure work safety, the workers of enterprises, institutions and organizations and citizens undergo medical examinations prior to starting work and periodically thereafter in accordance with an established list.

The list of harmful production factors and jobs in regard to which preliminary and periodic medical examinations are required and the procedures of such examinations are established by the special state organ of Turkmenistan for public health and epidemiological surveillance and by the Turkmenistan Ministry of Health, in coordination with trade unions.

Directors and other officials of enterprises, institutions and organizations are obligated to hold back permission to work from persons who have not undergone medical examinations or who are deemed unfit by reason of health to hold jobs for which such fitness is mandatory, and to provide workers with the necessary conditions allowing them to undergo medical examinations in a timely manner.

#### **Article 30. Responsibilities Regarding Prevention of the Onset and Spread of Diseases**

State organs, organs of local self-management, enterprises, institutions, organizations and citizens are obligated to provide for timely implementation of measures to prevent the onset and spread of infectious diseases, including radiation-induced diseases, and to eliminate them if they do occur.

For the purposes of preventing infectious diseases, citizens undergo mandatory preventive immunizations against tuberculosis, poliomyelitis, diphtheria, whooping cough, measles, tetanus and other infections. The procedure and schedule of immunizations and the population groups subject to immunization are determined by the special state organ of Turkmenistan for public health and epidemiological surveillance and by the Turkmenistan Ministry of Health.

In the event of the danger of onset and spread of infectious, parasitic and group noninfectious diseases and poisonings of people, the Turkmenistan Cabinet of Ministers, local organs of government and management and chief state public health physicians introduce, within the limits of their competency and in accordance with the established procedure, special conditions and regulations of work, study, passenger and freight travel in the corresponding territories or facilities, and when necessary, they organize disinfection, decontamination and other work directed at preventing the onset and spread of these diseases and at eliminating them.

Emergency epidemic control commissions are formed by the Turkmenistan Cabinet of Ministers and by local government organs for operational leadership and coordination of the activities of enterprises, institutions, organizations and citizens to prevent and eliminate mass diseases and poisonings of people.

Patients suffering infectious diseases, citizens suspected of having such diseases and citizens who had been in contact with infected patients are subject to laboratory testing and

medical observation, and when necessary, treatment and mandatory hospitalization and isolation (quarantine).

Citizens carrying agents of infectious diseases are subject to treatment. These same citizens, if they could be sources of the spread of infectious diseases in connection with the unique features of the production operations in which they are employed or the jobs they do, are transferred to other work temporarily with their consent, and when it is impossible to transfer them, they are suspended from work temporarily, until recovery, and social insurance assistance is paid to them.

#### **Article 31. Rights and Responsibilities of Foreign Citizens and Persons Without Citizenship**

Foreign citizens and persons without citizenship enjoy the same rights and bear the same responsibilities in the area of providing for the health and epidemiological well-being of the population on Turkmenistan territory as do citizens of Turkmenistan.

### **Section III. The State Public Health and Epidemiological Service**

#### **Article 32. The State Public Health and Epidemiological Service**

The State Public Health and Epidemiological Service is a unified system of organs and institutions specially empowered to organize, coordinate, monitor and inspect fulfillment of measures to provide for the health and epidemiological well-being of the population by state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens.

#### **Article 33. Objectives of the State Public Health and Epidemiological Service**

The objectives of the State Public Health and Epidemiological Service include preventing, revealing and stopping the influence of harmful environmental factors upon the health of the population with the purposes of preserving and strengthening it, shaping a healthy way of life and preventing disease.

#### **Article 34. Functions of the State Public Health and Epidemiological Service**

State Public Health and Epidemiological Service carries out the functions of:

- 1) state (supradepartmental) public health surveillance and epidemiological research;
- 2) maintaining records and statistics;
- 3) organizing and conducting social hygienic monitoring of the effects of environmental factors on the health of the population;
- 4) providing organizational and methodological leadership to efforts to provide for the health and epidemiological well-being of the population;
- 5) organizing and implementing public health, hygienic and epidemic control measures aimed at preventing and eliminating infectious and parasitic diseases and food poisonings;

6) hygienic standardization and regulation of harmful environmental factors;

7) protecting Turkmenistan territory from entry and spread of infections subject to quarantine, and entry of food products and articles of consumption dangerous to health;

8) disseminating hygienic knowledge regarding establishment of a healthy way of life.

**Article 35.** The System of Organs and Institutions of the State Public Health and Epidemiological Service of Turkmenistan

Organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan comprise a unified system headed by the special state organ of Turkmenistan for public health and epidemiological surveillance, in which lower institutions are subordinated to higher institutions at the state level.

The system of organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan includes:

- 1) the special state organ of Turkmenistan for public health and epidemiological surveillance;
- 2) territorial public health and epidemiological stations at all levels, as well as public health and epidemiological stations in water and air transportation;
- 3) disinfection stations;
- 4) a plague control station and its local divisions;
- 5) scientific research and other specialized institutions of a hygienic and epidemiological profile.

The special state organ of Turkmenistan for public health and epidemiological surveillance is subordinated in its activities to the President of Turkmenistan.

The manner in which the special state organ of Turkmenistan for public health and epidemiological surveillance is organized and operates is determined by a corresponding Statute approved by the Turkmenistan Cabinet of Ministers.

**Article 36.** Officials of the State Public Health and Epidemiological Service

Leadership of organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan is assigned to the Chief State Public Health Physician of Turkmenistan and his deputies, the chief physicians of public health and epidemiological stations at all levels of administration and of disinfection stations, and the chiefs of the plague control station and its divisions.

**Article 37.** Powers of Organs and Institutions of the State Public Health and Epidemiological Service of Turkmenistan

1. The following are under the jurisdiction of the special state organ of Turkmenistan for public health and epidemiological surveillance:

1) state public health surveillance of observance of Turkmenistan health legislation;

2) participation in development of legislative acts of Turkmenistan as regards providing for the health and epidemiological well-being of the population;

3) submission of issues concerned with providing for the health and epidemiological well-being of the population to state organs and organs of local self-management for examination;

4) participation in development of state programs as regards providing for the health and epidemiological well-being of the population;

5) coordination on planning norms and state standards;

6) approval of hygienic standards and monitoring methods;

7) establishment of coordination procedures and the procedures for granting permission for the use of new chemical substances, equipment, processes, polymers, plastics and other chemical substances;

8) coordination on issue of permits to use resources and methods in the production and processing of food products, agricultural plant and animal growth stimulators, and chemical plant protection resources;

9) coordination of training programs, training and work loads, and a sample lesson schedule for children attending children's preschool institutions and students in secondary and vocational-technical schools;

10) coordination of the activities of departmental organs of public health and epidemiological services;

11) interaction with other state monitoring organs as regards providing for the health and epidemiological well-being of the population;

12) coordination of scientific support to the health and epidemiological well-being of the population and of the activity of the State Public Health and Epidemiological Service of Turkmenistan;

13) resolution of other issues associated with the activity of the special state organ of Turkmenistan for public health and epidemiological surveillance.

2. Institutions of the State Public Health and Epidemiological Service of Turkmenistan listed in Article 35 of this Code do the following on their territory:

1) conduct public health surveillance and monitoring of compliance of local organs of government and management, enterprises, institutions, organizations, officials and citizens with Turkmenistan health legislation, and their fulfillment of public health, hygienic, epidemic control and antiradiation measures;

2) participate in the drafting of legislative acts and decisions of local organs of government and management, and programs as regards providing for the health and epidemiological well-being of the population;

- 3) coordinate on technical standards and issue permits for the use of new chemical substances, equipment, processes, polymers, plastics and other chemical substances within the limits of their competency;
- 4) coordinate the activities of departmental institutions of public health and epidemiological services;
- 5) interact with other state monitoring organs as regards providing for the health and epidemiological well-being of the population;
- 6) organize social hygienic monitoring;
- 7) organize implementation of measures to prevent and eliminate infectious and parasitic diseases.

**Article 38. Financing of Organs and Institutions of the State Public Health and Epidemiological Service of Turkmenistan**

Organs and institutions of the State Public Health and Epidemiological Service are financed by the centralized budget of Turkmenistan as well as by resources other than the budget.

Unutilized budgetary assets remain at the disposal of health and preventive institutions, and are not subject to confiscation.

**Section IV. Record Keeping and Statistics**

**Article 39. Objectives and Content of Record Keeping and Statistics**

The objectives of record keeping and statistics are to collect, process and analyze statistics characterizing the health of the population and the environment.

Record keeping and statistics are comprised of:

- 1) establishment of a record keeping system as the basis for reporting;
- 2) formation of a statistical data bank;
- 3) analysis of statistics on the size and composition of the population and its health;
- 4) analysis of statistics on the state of the environment;
- 5) analysis of statistics on the networks, staffs, personnel and activities of institutions of the public health and epidemiological service and of public health institutions.

**Article 40. Providing for Maintenance of Records and Statistics**

Records and statistics are maintained on the basis of state statistical forms approved by the special state statistical organ of Turkmenistan, and on the basis of sector accounting and reporting forms approved by the corresponding ministries and departments. The list of organs responsible for maintaining records and statistics characterizing the health of the population and the environment is established by the Turkmenistan Cabinet of Ministers in accordance with advice of the special state organ of Turkmenistan for public health and epidemiological surveillance and the special state statistical organ of Turkmenistan.

**Section V. Forecasting**

**Article 41. The Forecasting System**

The system for forecasting the health and epidemiological well-being of the population has the purpose of revealing trends and patterns in the change of the public health, hygienic and epidemiological situation, and the health of the population on the basis of social hygienic monitoring.

**Article 42. Programs Providing for the Health and Epidemiological Well-Being of the Population, and Their Content**

In order to preserve and strengthen the health of the population and future generations on the basis of forecasts, state organs of local self-management are obligated to draw up, finance and implement state, regional and specific-purpose programs to provide for the health and epidemiological well-being of the population.

Programs providing for the health and epidemiological well-being of the population foresee determination of:

- 1) the basic directions, goals, objectives and anticipated results;
- 2) specific measures;
- 3) sources of their financing and their material and technical support;
- 4) support in scientific methodology;
- 5) completion deadlines, responsible executors and the monitoring system.

**Article 43. Program-Implementing Organs**

Programs providing for the health and epidemiological well-being of the population are implemented by:

- 1) state organs and organs of local self-management;
- 2) organs and institutions of the special state organ of Turkmenistan for public health and epidemiological surveillance and of the Turkmenistan Ministry of Health;
- 3) enterprises, institutions and organizations.

**Section VI. Public Health Standardization**

**Article 44. Objectives of Public Health Standardization**

The objectives of public health standardization are:

- 1) to develop criteria for evaluating the sanitary condition of the environment;
- 2) to determine optimum or maximally permissible levels of influence of a complex of environmental factors of chemical, physical or biological influence upon the human body and of individual factors with the purpose of preventing their unfavorable effects upon the health of people;
- 3) to establish requirements ensuring the safety of the activities of economic facilities and transportation resources or their harmlessness to the health of people.

**Article 45. Basic Requirements on Public Health Standardization**

The basic requirements on public health standardization are developed with regard for the level reached in Russian and foreign science and for scientific and technical progress, and on the basis of comprehensive experimental, laboratory and clinical research.

**Article 46. The System of Public Health Standardization**

The system of public health standardization includes:

- 1) state public health norms and regulations and hygienic standards;
- 2) interim public health norms and regulations;
- 3) departmental technical standards.

**Article 47. Public Health Regulations and Norms and Hygienic Standards**

Public health regulations and norms and hygienic standards are normative acts establishing the criteria of the safety of human environmental factors and (or) their harmlessness to man, and the requirements on providing favorable conditions for his vital activities.

Public health regulations and norms and hygienic standards are binding upon all state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens.

**Article 48. Procedure for Developing Public Health Norms and Regulations and Hygienic Standards**

State hygienic standards are developed experimentally by scientific research and other institutions, creative collectives and highly qualified specialists.

State and interim public health norms and regulations are developed by organizations and institutions on the basis of hygienic standards (international and state) approved according to the established procedure, with regard for the specific public health, hygienic and epidemiological situation in the territory. Departmental technical standards are also developed by this procedure.

**Article 49. Procedure for Approving and Reviewing Public Health Norms and Regulations and Hygienic Standards**

State and interim public health norms and regulations are approved by the Chief State Public Health Physician of Turkmenistan.

State public health norms and regulations are reviewed at the time of introduction of new hygienic standards and of changes in the public health, hygienic and epidemiological situation.

Hygienic standards are approved by the Chief State Public Health Physician of Turkmenistan upon submission of an experimental research data sheet, an act and a conclusion of an expert commission and other documents necessary in each specific case by the developer.

Hygienic standards are reviewed whenever new scientific and practical data appear, but not less than once every 10 years.

**Article 50. Relationship Between International and State Public Health Norms and Regulations and Hygienic Standards**

International public health norms, regulations and hygienic standards become effective on Turkmenistan territory after their confirmation by a corresponding order of the Chief State Public Health Physician of Turkmenistan.

The action of international public health norms and regulations and hygienic standards is suspended by a resolution of the Chief State Public Health Physician of Turkmenistan when they conflict with state public health norms and regulations and hygienic standards.

**Article 51. Departmental Public Health Norms and Regulations**

Departmental public health norms and regulations and other technical standards are enacted by ministries and departments with the goal of preventing the harmful influence of environmental factors and objects upon the health of workers and the population.

Departmental public health norms and regulations and other technical standards must not conflict with state public health norms and regulations and hygienic standards currently in effect.

Departmental public health norms and regulations and other normative acts are subject to repeal by the officials who published them in the event of their inconsistency with currently effective public health norms and regulations and hygienic standards, in response to representations of the chief state public health physicians of the corresponding administrative territories, or in response to a protest from the procurator, or on the basis of court proceedings.

**Article 52. Publication of Public Health Norms and Regulations and Hygienic Standards**

Public health norms and regulations and hygienic standards are subject to mandatory publication within three months' time from the moment of their approval, at the expense of the corresponding ministries, departments and organizations.

Officials approving public health norms and regulations and hygienic standards are obligated to submit to the mass media, within a month's time, information on the normative acts being enacted.

**Article 53. Guarantees of Observance of Public Health Norms and Regulations and Hygienic Standards**

Acts published by local organs of government and management and by public organizations must not conflict with public health legislation or hinder execution and limit the application of public health norms and regulations and hygienic standards approved in accordance with the established procedure, nor can they repeal them.

Acts conflicting with public health legislation or hindering and limiting application of public health norms and regulations and hygienic standards approved in accordance with the established procedure are subject to repeal by the organs that published them or by higher organs in response to

representations of the Chief State Public Health Physician of the corresponding administrative territory, or in response to protest from the procurator, or on the basis of court proceedings.

Failure of state organs, organs of local self-management, enterprises, institutions, organizations and citizens to comply with public health norms and regulations and hygienic standards incurs liability in accordance with articles 88-91 of this Code.

## Section VII. Public Health Expert Evaluation

### Article 54. Objectives of Public Health Expert Evaluation

The objectives of public health expert evaluation are:

- 1) comprehensive evaluation of the possible influence of environmental objects upon the public health, hygienic and epidemiological situation and the health of the population;
- 2) higher quality and greater safety of objects subjected to expert evaluation;
- 3) confirmation of the causes and conditions of mass or group diseases and poisonings of people;
- 4) evaluation of the correspondence of decisions adopted in the course of business or other activity to the requirements of health legislation, public health norms and regulations and hygienic standards, with regard for the present level of science and practice.

### Article 55. Objects of Public Health Expert Evaluation

Objects of public health expert evaluation include:

- 1) drafts of programs and conceptions of scientific-technical progress, and of social and economic development;
- 2) drafts of plans for developing and locating productive forces;
- 3) drafts of master plans for miners' settlements and oba [translation unknown];
- 4) feasibility studies and design data for construction (reconstruction, reequipment) of national economic facilities;
- 5) drafts of construction and production design norms;
- 6) plans for construction (reconstruction, modernization and reequipment) of productive and civil facilities and their start-up complexes, and regional plans;
- 7) materials concerned with selection of land parcels for construction of productive and civil facilities;
- 8) drafts of maximally permissible limits for releases and discharges of toxic substances into the air and into water basins;
- 9) new products and the procedures of their manufacture at the time of their development and placement into production and use, including products and procedures purchased abroad;
- 10) permits for special water use;

11) drafts of documents regulating the study and work load and schedule of training, education, labor, meals and rest of children and juveniles;

12) dietary raw materials and food products, and drinking water;

13) conclusions of institutions of the State Public Health and Epidemiological Service and departmental public health and epidemiological services regarding the causes and conditions of onset of mass or group diseases and poisonings of people;

14) other objects.

### Article 56. Mandatory Public Health Expert Evaluation

Public health expert evaluation is conducted mandatorily:

- 1) when determining the location of facilities of nuclear power engineering and industry, facilities in a health resort zone, and facilities that discharge and release chemical and biological substances into the environment in cases of the absence of maximally permissible concentrations, of conditionally safe levels of substances, and of the methods of their determination; when determining the location of facilities in places recognized to be zones of ecological disaster and facilities with new production processes having no analogues, and in other cases directly foreseen by Turkmenistan legislation;
- 2) when so ordered by higher organs of state government and management.

### Article 57. Public Health Expert Evaluation Based on Applications

Public health expert evaluation is conducted on the basis of applications of state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens in cases not foreseen by Article 56 of this Code.

### Article 58. Organization and Conduct of Public Health Expert Evaluation

Public health expert evaluation is conducted by expert commissions (an expert) chosen from among competent specialists.

The membership of expert commissions does not include specialists:

- 1) who had taken part in the preparation of documents subject to expert evaluation;
- 2) without their consent;
- 3) who had previously published their point of view on the object of expert evaluation under consideration in the mass media.

The procedure and financing source are determined by the organ that called for public health expert evaluation.

Mandatory public health expert evaluation is conducted at the expense of the requester by expert commissions (an expert) of membership determined in coordination with local organs of government and management.

The need for international public health expert evaluation is determined by the organ that called for the expert commission.

**Article 59. Responsibilities of the Parties in Expert Evaluation**

1. The requester of expert evaluation is obligated:

- 1) to furnish documents on a list determined by the expert commission (expert) conducting the expert evaluation;
- 2) to submit additional information as demanded by the expert commission (expert) conducting the expert evaluation;
- 3) to determine the source of financing of scientific research for which a need was revealed in the course of expert evaluation.

2. The expert commission (expert) is obligated:

- 1) to promptly conduct a high quality expert evaluation;
- 2) to draft an expert conclusion;
- 3) to ensure openness of the expert evaluation.

The timetable of expert evaluation is established by mutual agreement of the parties.

**Article 60. Expert Conclusions**

The results of the activity of expert commissions (expert) are documented by a certificate of public health expert evaluation, and in relation to the organ that had called for the expert evaluation they are treated as recommendations.

In cases of mandatory expert evaluation, the conclusions must be regarded by the requester. In the event that the requester disagrees with the conclusion of the expert evaluation, the dispute is resolved in accordance with the procedure foreseen by Article 62 of this Code.

**Article 61. Payment for the Work of Members of Expert Commissions (an Expert)**

Members of expert commissions (an expert) work on a paid basis.

The amount of the payment is established by contract by the organ that had called for the expert evaluation.

**Article 62. Resolution of Disputes Regarding Results of Expert Evaluations**

Disputes regarding results of public health expert evaluation are examined by a court or an economic court on the basis of a suit filed by the interested party, in accordance with a procedure determined by Turkmenistan legislation.

Disputes of state organs, organs of local self-management, enterprises, institutions, organizations and citizens of Turkmenistan regarding public health expert evaluation with another state are examined by commissions formed on the basis of parity from among representatives of the interested states in accordance with a procedure determined by legislation of Turkmenistan and other states.

**Article 63. Responsibility of Participants of an Expert Evaluation**

Members of an expert commission (an expert) bear responsibility for proper conduct of an expert evaluation and objectivity of its conclusions in accordance with Turkmenistan legislation.

**Article 64. Public Expert Evaluation**

Public associations possessing charters registered in accordance with the Turkmenistan Law "On Public Associations" have the right to send their own representatives to take part in public health and other special expert evaluations. The organ that called for the expert evaluation is obligated to include the indicated representatives in the membership of the expert commission as experts with rights and responsibilities foreseen by articles 59-61, 63 of this Code. The work of the indicated representatives as experts is paid by the public association that sent them.

The same procedure may be followed in regard to participation of representatives of organs of territorial public self-management in public health and other special expert evaluations.

Public associations and organizations may independently call for and conduct public health and other special expert evaluations at their own expense. The requirements of articles 54, 55, 59-61, 63 of this Code apply to such evaluations.

The results of a public expert evaluation must be reviewed at the time when state organs and organs of local self-management adopt decisions on matters concerned with providing for the health and epidemiological well-being of the population. The results of the examination are communicated to the public association or organization that had called for the expert evaluation, not later than a week prior to adoption of a decision on the object of the expert evaluation.

**Section VIII. Social Hygienic Monitoring**

**Article 65. Objectives and Principles of Social Hygienic Monitoring**

The objectives of social hygienic monitoring (observation, evaluation, prediction) include revealing, accounting for and analyzing unfavorable environmental factors, forecasting, and developing a package of preventive measures directed at preventing and eliminating the harmful influence of these factors upon the health of the population.

The basic principles of social hygienic monitoring are continuity, dependability, consideration of numerous factors, informativeness, and a standard approach to observing the state of the environment and the health of the population.

**Article 66. Content of Social Hygienic Monitoring**

Social hygienic monitoring is conducted at the level of an object, an etrap, a shakher, a velayat and the state in regard to:

- 1) the level and structure of noninfectious and infectious morbidity;
- 2) demographic processes;
- 3) the population's physical development;

- 4) air, water basins, soil;
- 5) the quality of dietary raw materials, food products and drinking water;
- 6) the working, personal, child-raising and educational conditions of the population.

**Article 67. Organs Conducting Social Hygienic Monitoring**

The list of organs conducting social hygienic monitoring is established by the Turkmenistan Cabinet of Ministers on the advice of the special state organ of Turkmenistan for public health and epidemiological inspection.

Data obtained as a result of social hygienic monitoring are submitted to institutions of the State Public Health and Epidemiological Service.

**Section IX. Public Health Monitoring and Surveillance**

**Article 68. Organs Responsible for Public Health Monitoring and Surveillance**

State monitoring and surveillance of compliance with health legislation are the responsibility of state organs of government and management and of state organs specially empowered to carry out such work.

Departmental public health surveillance is carried out at existing facilities and facilities under construction of the corresponding ministries and departments by their organs, institutions, subdivisions and officials of the public health and epidemiological service on the basis of state and departmental public health norms and regulations and hygienic standards, drawn up and approved in accordance with requirements of articles 48, 49, 51, 52 of this Code.

The activity of the indicated services is monitored by the special state organ of Turkmenistan for public health and epidemiological surveillance, and it must not conflict with health legislation of Turkmenistan.

Observance of public health norms and regulations and hygienic standards in production shops and other production sections, the state of the air, soil and water basins, observance of epidemic control measures in public health institutions, and correspondence of manufactured and sold products to public health norms and regulations and hygienic standards are checked by the corresponding enterprises, institutions, organizations and citizens.

Public associations and organizations and citizens monitor compliance with health legislation, public health norms and regulations and hygienic standards, and the implementation of public health, hygienic, epidemic control and antiradiation measures.

Surveillance over precise and uniform execution of laws ensuring the health and epidemiological well-being of the population by state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens is maintained by procuracy organs in accordance with Turkmenistan legislation.

**Article 69. Monitoring by Local Organs of Government and Management**

Local organs of government and management provide for state monitoring of observance of health legislation by enterprises, institutions, organizations and citizens located on their territory, and their implementation of measures to provide for the health and epidemiological well-being of the population.

**Article 70. State Public Health Surveillance**

State (departmental) public health surveillance over compliance with health legislation, public health norms and regulations and hygienic standards by state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens is carried out by the State Public Health and Epidemiological Service.

The powers of organs and institutions of the State Public Health and Epidemiological Service carrying out state public health surveillance are determined by this Code and other legislative acts of Turkmenistan.

**Article 71. Departmental Public Health Surveillance and Its Procedure**

Departmental public health surveillance of facilities of the corresponding ministries and departments is carried out on the basis of this Code, in accordance with standards of the special state organ of Turkmenistan for public health and epidemiological surveillance, and in accordance with departmental standards adopted on their basis.

Departmental organs and institutions of the public health and epidemiological service carrying out public health surveillance are obligated to coordinate the following with institutions of the State Public Health and Epidemiological Service:

- 1) reservation of land parcels for construction of departmental facilities;
- 2) the conditions of water consumption and water diversion, including the methods of liquid waste treatment;
- 3) measures to protect the air from contamination;
- 4) reservation of land parcels to be used as testing grounds for the decontamination and burial of toxic industrial and domestic wastes, as well as processing and salvaging methods;
- 5) the location of children's summer health-improving institutions, and granting of permission for the entry of children.

**Article 72. Industrial Public Health Monitoring and Its Procedure**

Observance of public health norms and regulations and hygienic standards in shops and in other production sections, and the state of air, soil and water basins are monitored by enterprises, institutions and organizations.

The quality and safety of dietary raw materials, food products and industrial articles, including articles for children, of construction materials, packaging materials, polymers and articles made from them, perfumes and cosmetic products, drugs, medical immunological preparations, the domestic and drinking water supply, water basins and seacoast in places of cultural and personal water use by the population,

and the state of industrial and domestic liquid wastes are monitored by enterprises, institutions and organizations in accordance with currently effective public health norms and regulations and hygienic standards.

Observance of public health and epidemic control measures and the effectiveness of disinfection and sterilization in public health institutions are monitored by the laboratories of these institutions.

Organs carrying out industrial public health monitoring must undergo certification, and they must employ established research methods.

Industrial monitoring of observance of public health norms and regulations and hygienic standards is provided for by the laboratories of enterprises, institutions and organizations or on a contract basis.

The range and frequency of analyses, the sampling places and conduct of other analyses are determined by currently effective technical standards and upon coordination with institutions of the State Public Health and Epidemiological Service or of departmental public health and epidemiological services.

Industrial monitoring results are documented on forms approved for organs and institutions carrying out state public health surveillance, and they are submitted by them in accordance with a procedure established by the Turkmenistan Cabinet of Ministers.

Institutions of the State Public Health and Epidemiological Service and of departmental public health and epidemiological services provide organizational and methodological leadership to laboratories conducting industrial monitoring and make selective checks of their activity.

#### **Article 73. Health Monitoring by the Public and Its Procedure**

Public associations and organizations, labor collectives and citizens monitor observance of health legislation, public health norms and regulations and hygienic standards, and implementation of public health, hygienic, epidemic control and antiradiation measures in accordance with their charters and other normative acts regulating their activity.

Public participation in public health monitoring takes the form of:

- 1) participation in state expert evaluations;
- 2) public expert evaluations;
- 3) participation in efforts to assess the environmental effects of implementing decisions and programs adopted by state organs and organs of local self-management, and measures implemented by enterprises, institutions and organizations.

Participation of representatives of public associations and organizations in state public health and other special expert evaluations is determined in compliance with Article 64 of this Code.

Participation of public associations and organizations in evaluating environmental effects is in correspondence with Turkmenistan legislation.

#### **Article 74. Interaction in Public Health Monitoring and Surveillance**

Organs, institutions and officials of the State Public Health and Epidemiological Service of Turkmenistan:

- 1) provide methodological leadership and coordination to the activities of departmental organs and institutions of public health and epidemiological services, of the corresponding services of enterprises, institutions and organizations, and of public associations and organizations responsible for monitoring compliance with public health norms and regulations and hygienic standards;

- 2) provide assistance to subordinated organs and institutions of the public health and epidemiological services in training and upgrading medical personnel in scientific, educational and practical institutions of the special state organ of Turkmenistan for public health and epidemiological surveillance and of the Turkmenistan Ministry of Health;

- 3) submit information, as needed by subordinated organs and institutions of the public health and epidemiological services, on the population's morbidity and on the public health, hygienic and epidemiological situation in administrative territories.

Subordinated organs and institutions of the public health and epidemiological services and the corresponding services of enterprises, institutions and organizations are obligated to submit the required statistics to organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan.

#### **Article 75. Officials Conducting State Public Health Surveillance**

The responsibility of organizing and conducting state public health surveillance is carried by the following officials:

- 1) by the Chief State Public Health Physician of Turkmenistan and his deputies;
- 2) by the chief state public health physicians of velayats, shakhs and etraps, of water basins in water transportation, as well as in air transportation, and by their deputies.

#### **Article 76. Appointment and Dismissal of Persons Conducting State Public Health Surveillance**

The Chief State Public Health Physician of Turkmenistan and his deputies are appointed and dismissed from their positions by the President of Turkmenistan.

The chief state public health physicians of velayats, of the shakhs of Ashgabat, and of air transportation, and their deputies, are appointed and dismissed from their positions by the Chief State Public Health Physician of Turkmenistan.

The chief state public health physicians of shakhs and etraps, and of water basins in water transportation, and their deputies, are appointed and dismissed from their positions by the chief state public health physicians of velayats in coordination with the Chief State Public Health Physician of Turkmenistan.

**Article 77. Acts of Officials Conducting State Public Health Surveillance**

Acts of officials conducting state public health surveillance include conclusions issued by chief state public health physicians and their deputies upon examining planning documents, preliminary planning documents and technical standards, resolutions suspending construction, certain types of jobs and operation of enterprises and equipment, and resolutions imposing fines and penalties. These acts are binding upon all state organs, organs of local self-management, enterprises, institutions, organizations and citizens.

**Article 78. Basic Guarantees of the Activity of Officials Conducting State Public Health Surveillance**

Chief state public health physicians and other officials conducting state public health surveillance are independent in their activity and are guided only by existing legislation.

Requiring officials and workers of the State Public Health and Epidemiological Service of Turkmenistan to do work not associated with their basic activity is prohibited.

**Article 79. Impermissibility of Interference in Activity Associated With State Public Health Surveillance**

Interference in activity associated with state public health surveillance conducted in accordance with this Code and other acts of public health legislation is prohibited.

Influence of any form whatsoever upon officials carrying out state public health surveillance on the part of state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens with the purpose of hindering their lawful activity incurs liability in accordance with Turkmenistan legislation.

**Article 80. Responsibilities of Officials of the State Public Health and Epidemiological Service of Turkmenistan**

1. The Chief State Public Health Physician of Turkmenistan and his deputies are obligated:

1) to manage organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan;

2) to determine the basic objectives, priority directions and principles of the activity of organs and institutions conducting state public health surveillance;

3) to approve and systematize state public health norms and regulations and hygienic standards, with regard for the existing public health and epidemic situation;

4) to publish conclusions on drafts of normative acts and technical standards drawn up by organs of state management;

5) to publish acts on the basis and in execution of laws of Turkmenistan, ukases of the President of Turkmenistan and decrees and orders of the Turkmenistan Cabinet of Ministers regarding the health and epidemiological well-being of the population;

6) to determine territories dangerous to the life and health of people, in which the population is prohibited from residing and from conducting agriculture and other economic activity;

7) to draft proposals for state programs to prevent diseases and publicize a healthy way of life;

8) to develop and organize implementation of measures protecting Turkmenistan territory from entry and spread of infections subject to quarantine;

9) to draw up interim public health norms and regulations in response to extreme situations, natural disasters and catastrophes of anthropogenic origin;

10) to organize and conduct special expert evaluations of problems concerned with the health and epidemiological well-being of the population;

11) to coordinate activity associated with conducting departmental public health surveillance at facilities of corresponding ministries and departments;

12) to coordinate international cooperation in the area of the health and epidemiological well-being of the population.

2. The chief state public health physicians of administrative territories and their deputies are obligated to carry out state public health surveillance over observance of Turkmenistan legislation, public health norms and regulations and hygienic standards by state organs, organs of local self-management, enterprises, institutions, organizations and citizens within the limits of the corresponding territory when:

1) developing the conceptions and specific-purpose programs of state organs, organs of local self-management, enterprises, institutions and organizations;

2) carrying out long-range planning of the distribution of national economic facilities and productive forces;

3) drawing up plans for locating health resorts, and laying out and building up population centers;

4) reserving land parcels for construction, reconstruction and expansion of national economic facilities, public and residential buildings, and privately built structures and buildings;

5) designing, building, reconstructing and placing enterprises into operation, and changing their profile and production procedures;

6) drawing up technical standards;

7) operating facilities.

3. Chief state public health physicians and other officials are obligated to do the following in accordance with their competency and on the basis of materials obtained as a result of state public health surveillance:

1) to participate in developing measures to ensure the health and epidemiological well-being of the population;

2) to submit proposals and conclusions to state organs and organs of local self-management regarding the health and

epidemiological well-being of the population and implementing health improvement measures;

3) to submit conclusions and proposals to state organs and organs of local self-management concerning prohibition of residency, agricultural work and other economic activity by the population in territories dangerous to the life and health of people;

4) to inform state organs, organs of local self-management, enterprises, institutions and organizations when violations of health legislation by facilities under their surveillance occur;

5) to participate in drafting measures to protect territory from entry and spread of infectious diseases subject to quarantine and other infectious diseases which would be binding upon all state organs, organs of local self-management, enterprises, institutions, organizations and citizens;

6) to coordinate the activity of public health institutions in regard to the health and epidemiological well-being of the population, and in regard to protection of territory from entry and spread of infectious diseases subject to quarantine and other infectious diseases;

7) to determine population groups subject to preliminary and periodic examinations and clinical treatment in connection with the effects of environmental factors and the population's living and working conditions upon the human body, and to participate in analyzing the results of periodic medical examinations and clinical observation and in developing health improvement measures;

8) to review and analyze the causes and conditions of work-related poisonings and illnesses, and food poisonings;

9) to organize epidemic control measures in foci of infectious and parasitic diseases within the limits of their competency;

10) to provide the population with information on the condition of the environment from the standpoint of public health and its influence on the health of the individual, on public health norms and regulations and hygienic standards currently in effect, and on measures and decisions which can have an effect on the environment and the health of the population;

11) to provide hygienic training to individual population groups on a contract basis, and to subsequently certify their training;

12) to participate in disseminating medical and hygienic knowledge and in shaping a healthy way of life;

13) to maintain state, official and commercial secrecy.

Chief state public health physicians and their deputies may also carry out the responsibilities indicated in paragraphs 2, 7 and 10 in the first part of this article.

#### **Article 81. Rights of Chief State Public Health Physicians and Other Officials**

Chief state public health physicians and their deputies have the right:

1) to refuse approval of preliminary and design documents regarding selection of a land parcel, construction, reconstruction and the expansion of housing, public, production and other national economic facilities that do not satisfy the requirements of public health norms and regulations and hygienic standards;

2) to prohibit or suspend the work of operating production facilities of industry, transportation, agriculture and communications, individual types of jobs, production processes, equipment, tools, hydraulic engineering facilities, public and residential buildings, complexes, structures and other facilities until violations of public health norms and regulations and hygienic standards are corrected;

3) to suspend the construction, reconstruction and planning or conduct of certain types of work associated with building up population centers and erecting industrial, public and residential buildings, complexes and structures and other facilities when public health norms and regulations and hygienic standards are violated;

4) to prohibit production, use and sale of new types of raw and other materials, substances, articles and other products of the national economy, the procedures of their manufacture, dietary raw materials and food products in the event that they are recognized to be dangerous to the life and health of people;

5) to prohibit production and use of chemical substances and medical immunobiological drugs not registered according to the established procedure;

6) to prohibit the use of chemical substances, agents and methods in practical domestic drinking water supply, in production and processing of food products, and as agricultural plant and animal growth stimulators and regulators, of other chemicals, and of perfume and cosmetic products in the event that the danger exists that they may have a harmful influence upon the health of people, and equally so, in the event of appearance of data indicating their possible harmful influence upon human health, until such time that the developer submits scientifically grounded data indicating the safety of these substances and materials;

7) to prohibit the use of water for drinking and domestic water supply when it is recognized to be unfit for use;

8) to impose temporary work suspensions on persons violating public health requirements;

9) to require state organs, organs of local self-management, enterprises, institutions, organizations, officials and citizens to correct violations of public health norms and regulations and hygienic standards;

10) to maintain surveillance over observance of the requirements of public health norms and regulations and hygienic standards in plans for construction and reconstruction of facilities;

11) to follow the established procedure in making known, to state organs, organs of local self-management, enterprises, institutions, organizations and citizens, their binding conclusions, based on existing public health norms and regulations and hygienic standards, regarding plans for the layout

and build-up of population centers, long-range plans for locating national economic facilities, plans for construction and reconstruction of enterprises, buildings and structures, and their conclusions regarding land parcels offered for construction, determination of places of public water use and the conditions of release of liquid wastes, and recycling and burial of toxic, chemical, radioactive and other substances;

12) to examine drafts of standards and specifications on new types of raw and other materials, substances, articles and other products of the national economy, the procedures of their manufacture, dietary raw materials and food products;

13) to offer conclusions concerning correspondence of industrial, public and residential buildings, complexes, agricultural and other enterprises and structures with existing public health norms and regulations and hygienic standards;

14) to offer conclusions regarding proposals submitted on the educational and work load and on the recommended lesson schedule for children being raised in children's and juvenile institutions and studying in schools;

15) to instruct scientific research institutions, laboratories, higher educational and other institutions and organizations to conduct special expert evaluations in the necessary cases, irrespective of their departmental subordination;

16) to visit national economic facilities and other economic facilities unhindered (upon presentation of official identification) at any time of the day with the purpose of verifying observance of existing public health norms and regulations and hygienic standards;

17) to require executives of enterprises, institutions and organizations and citizens:

- to bar from work any persons presenting a danger of spread of infectious and parasitic diseases in connection with the particular features of the work they do or the production operation in which they are employed, as well as persons who systematically fail to observe public health norms and regulations and hygienic standards and epidemic control measures;
- to hospitalize patients who carry infections and parasites and who present a danger to surrounding individuals;
- to implement preventive and epidemic control measures;
- to compensate for damages from harm inflicted upon the health of citizens;
- to pay fines;
- to compensate for expenses incurred by therapeutic, preventive and public health institutions conducting hygienic, epidemic control and medical measures in response to mass diseases and poisonings of people;

18) to require officials and private citizens to present information and explanations, personally or in writing, necessary to clarify the public health status of facilities and to conduct epidemiological analysis of health;

19) to take samples of food products, articles, objects and materials for laboratory analysis and hygienic expert evaluation, and to conduct the necessary laboratory and instrumental analyses right at the facilities;

20) to enlist the aid of specialists of other departments and institutions and the public on a contract basis to conduct public health monitoring;

21) to summon officials and citizens to institutions of the State Public Health and Epidemiological Service for examination of materials regarding cases of violation of Turkmenistan health legislation, public health norms and regulations and hygienic standards;

22) to examine cases of public health violations, to impose administrative punishments, to forward materials to investigatory organs in support of criminal proceedings, and to submit proposals on disciplinary punishments to higher officials or management organs;

23) to submit proposals to state organs and organs of local self-management regarding prohibition of settlement of certain territories or establishment of special terms and conditions of residence of the population and its engagement in economic activity with the purpose of eliminating and preventing the spread of mass diseases and poisonings of the population;

24) to request loan and financing organs to cancel their financing of (loan support to) the planning, construction and economic activity of enterprises, institutions, organizations and citizens that fail to observe public health norms and regulations, hygienic standards and resolutions of organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan requiring them to suspend or halt this activity;

25) to determine the groups of persons subject to preventive immunizations on the basis of epidemiological indications.

Rights foreseen in paragraphs 9, 16, 18 and 19 of this article also apply to officials and specialists of organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan.

#### **Article 82. Appeal of Actions of Chief State Public Health Physicians and Their Deputies**

The actions of chief state public health physicians and their deputies foreseen in paragraphs 1-7, Article 81 of this Code may be appealed by an interested person within a month's time to the higher chief state public health physician, the court, and the procurator at the person's place of residence or at the location of the facility in relation to which these actions are taken.

An appeal pending upon these actions does not constitute grounds for suspending their execution.

#### **Section X. The Economic Mechanism of Providing for the Health and Epidemiological Well-Being of the Population**

**Article 83. Compensation for Expenses of Eliminating Unfavorable Effects Upon the Working, Personal and Recreational Conditions of the Population**

Enterprises, institutions, organizations and citizens committing violations of public health norms and regulations and hygienic standards that have led or may lead to higher morbidity of the population and worsening of demographic indicators compensate the expenses of the budget system out of their own assets.

The indicated assets are collected from enterprises, institutions, organizations and citizens at the request of organs and institutions conducting state public health surveillance. If compensation of expenses is refused, the dispute is resolved in court or in an economic court.

The procedure for setting the amount collected and determining the disposal of collected money is determined by the Turkmenistan Cabinet of Ministers.

#### **Section XI. Hygienic Training and Education, Scientific Research**

##### **Article 84. Universality, Comprehensiveness and Continuity of Hygienic Training and Education**

Hygienic training and education directed at raising the public health awareness of the population and preventing diseases must be universal, comprehensive and continuous.

Hygienic training and education are conducted:

- 1) in the course of preschool training, and during study in schools of general education, vocational-technical schools, secondary special and higher educational institutions; during training and advanced training of specialists and their upgrading, by the inclusion of issues having to do with medical and hygienic knowledge into the training and education program;
- 2) in the course of occupational and hygienic training of executives, specialists and workers;
- 3) by disseminating medical and hygienic knowledge through the mass media at the expense of state and other financing sources;

##### **Article 85. Occupational Hygienic Training for Executives and Specialists**

Enterprises, institutions and organizations are obligated to provide occupational hygienic training to executives, specialists and workers involved in:

- 1) production, storage, transportation and sale of food products and drinking water;
- 2) the raising of children in children's preschool institutions;
- 3) communal and personal services to the population;
- 4) work with harmful substances and unfavorable production factors.

Occupational hygienic training is provided on a contract basis at the expense of the enterprises, institutions, organizations and citizens themselves.

##### **Article 86. Responsibility of State Organs, Organs of Local Self-Management, Enterprises, Institutions, Organizations and Officials Regarding Establishment of Conditions for a Healthy Way of Life**

State organs, organs of local self-management, enterprises, institutions, organizations and officials are obligated:

1) to establish the necessary conditions for shaping a healthy way of life by building, rebuilding and developing a modern material and equipment base, physical education and sports institutions, health improvement complexes, cultural and educational institutions, health centers, tourist and sports bases, sanatoriums and preventive treatment hospitals, and other institutions providing for the population's recreation and health improvement;

2) to disseminate knowledge and to provide hygienic training and education to the population directed at shaping a healthy way of life.

##### **Article 87. Scientific Hygienic and Epidemiological Research**

Scientific hygienic and epidemiological research is a component of the system for providing for the health and epidemiological well-being of the population, and it is carried out by scientific research institutes, by higher educational institutions, and by other organizations and institutions.

Scientific hygienic and epidemiological research is organized and coordinated by the special state organ of Turkmenistan for public health and epidemiological surveillance, by the Turkmenistan Ministry of Health, by the Turkmenistan Academy of Sciences, by the Academy of Agricultural Sciences, and by state organs and organs of local self-management within the limits of their competency and in accordance with the public health, hygienic and epidemiological situation in administrative territories.

Scientific hygienic and epidemiological research is conducted at the expense of the state budget, as well as on a contract or other basis.

#### **Section XII. Liability for Violation of Turkmenistan Health Legislation**

##### **Article 88. Public Health Violations and the Forms of Liability They Incur**

A public health violation is defined as an unlawful, blameworthy (deliberate or negligent) act (action or inaction) associated with disregard of Turkmenistan health legislation, including of public health norms and regulations and hygienic standards currently in effect, and the failure to carry out hygienic and epidemic control measures or to act on conclusions, resolutions, orders and prescriptions of officials of the State Public Health and Epidemiological Service of Turkmenistan.

The following are public health violations:

- 1) chemical, biological, physical and other contamination of food products, of open-air and underground water supply sources, water basins and seacoasts used by the population for cultural and personal purposes, the soil, atmospheric air and the air of a work zone;
- 2) the drafting of technical standards in violation of public health norms and regulations and hygienic standards, and

use of standards in one's activity that conflict with these public health norms and regulations and hygienic standards;

3) development of draft technical standards on new forms of raw materials, production equipment, processes, tools, food products and dietary raw materials, industrial articles, construction materials, sources of ionizing radiation, chemical substances and products, biological agents, packaging materials, polymers and other materials coming in contact with dietary raw materials, food products and medicinal agents, articles made from them, perfume and cosmetics, and other consumer goods in the absence of coordination with the Chief State Public Health Physician of Turkmenistan, and development of technical standards on new forms of medical immunobiological preparations without state surveillance;

4) the planning, construction, reconstruction, modernization and reequipping of enterprises, their start-up complexes, buildings and structures, transportation resources, water supply, sewage and liquid waste treatment systems, hydraulic engineering structures and other facilities, long-range build-up and distribution of population centers and industrial and agricultural facilities, and development of production processes, articles, equipment and tools in violation of public health norms and regulations and hygienic standards, and in the absence of coordination with organs and institutions carrying out state public health surveillance;

5) use of a land parcel for new construction, reconstruction or expansion of facilities in the absence of coordination with organs and institutions conducting state public health surveillance;

6) acceptance and placement of facilities into operation without the permission of organs and institutions conducting state public health surveillance;

7) production and use of new forms of raw materials, production equipment, processes and tools, food products and dietary raw materials, industrial articles, construction materials, sources of ionizing radiation, chemical substances and products, biological agents, packaging, polymers and other materials coming in contact with dietary raw materials, food products and medicinal agents, articles made from them, perfume and cosmetics, and other consumer goods, and medical immunobiological preparations in violation of public health norms and regulations and hygienic standards, without undergoing toxicological and hygienic evaluation and without establishing hygienic standards;

8) failure to observe requirements on the quality of dietary raw materials and food products, and when such products contain radionuclides and toxic, biological, chemical and other substances and compounds dangerous to the life and health of people at levels above those established by hygienic standards;

9) violation of public health norms and regulations and hygienic standards in the production, storage, transportation and sale of dietary raw materials and food products, use

of agricultural plant and animal growth stimulators, chemical and biological plant protection resources, packaging, polymers and other materials coming in contact with dietary raw materials, food products and medicinal agents, and feed additives for animals, without the permission of organs and institutions conducting state public health surveillance;

10) violation of sanitary norms and regulations and hygienic standards in the delivery, sale and use of imported production procedures, raw and other materials, and products;

11) failure to ensure that water supplied by centralized domestic and drinking water supply systems satisfies hygienic requirements and the state standard on water;

12) failure to ensure that the quality of water in decentralized water supply systems, water basins, seacoasts and places of cultural and personal water use by the population satisfies the corresponding public health norms and requirements;

13) violation of public health norms and regulations and hygienic standards regarding the upkeep of population centers and territories, and accumulation, storage, transportation and recycling of industrial (including radioactive and toxic), agricultural, domestic and personal wastes;

14) violation of public health norms and regulations and hygienic standards pertaining to protection of atmospheric air;

15) failure to observe public health norms and regulations and hygienic standards regulating the conditions of child-rearing and education, production practice, public health, hygienic and epidemic control conditions, requirements of radiation safety, and health legislation pertaining to diet and to working conditions, to the public health and personal support and rest of children and juveniles in children's preschool and health improvement institutions, secondary schools, vocational-technical schools and other institutions, and at enterprises;

16) failure to observe public health, hygienic and epidemic control regulations in public health and other institutions;

17) violation of public health norms and regulations and hygienic standards in work with radioactive substances and other sources of ionizing radiation, and when burying radioactive wastes;

18) failure to fulfill measures to prevent the spread of infectious and parasitic diseases and to eliminate them in the event that they arise;

19) unjustified refusal to carry out public health, medical, biological, technical, sociological and other special expert evaluations as instructed by organs and institutions of the State Public Health and Epidemiological Service of Turkmenistan;

20) deterioration of the health of citizens owing to the use of imperfect public health norms and regulations and hygienic standards and expert conclusions based on examination materials;

21) allowing people to take jobs without having undergone medical examinations or people who have been deemed unfit for such jobs due to their health when such fitness is mandatory;

22) failure to undergo mandatory medical examinations or violation of the schedule of examinations by certain categories of workers;

23) failure to carry out mandatory prescriptions, conclusions and resolutions of organs and institutions carrying out state public health surveillance;

24) evasion of the requirement to submit materials and information necessary to reveal the public health status and the epidemiological and radiological situation of a facility;

25) the breaking of seals affixed upon facilities closed by organs and institutions conducting state public health surveillance, or resumption of work in them;

26) failure of certain categories of blue and white collar workers determined by this Code to undergo mandatory hygienic training;

27) deliberate concealment or distortion of information on accidents, the public health status and the epidemiological and radiation situation, and the health of the population.

Officials and citizens of Turkmenistan who commit a public health violation may be subjected to disciplinary, administrative and criminal liability.

Foreign citizens and persons without citizenship located on Turkmenistan territory bear liability for violation of Turkmenistan health legislation on the same grounds as do citizens of Turkmenistan.

#### **Article 89. Disciplinary Liability**

Officials and workers of enterprises, institutions and organizations who commit public health violations are subject to disciplinary punishments foreseen by Turkmenistan legislation, up to and including exclusion from a job, dismissal from a position, and firing.

Executives of state organs, enterprises, institutions and organizations are obligated to impose disciplinary punishments upon officials and workers who commit a public health violation when requested to do so by the chief state public health physician or his deputy.

#### **Article 90. Administrative Liability**

Administrative punishments taking the form of a warning or a fine are imposed on officials and citizens who commit public health violations. A warning is issued in writing by the Chief State Public Health Physician or his deputy.

A fine is imposed by a resolution of the Chief State Public Health Physician or his deputy.

The right to impose a fine in its full volume is granted to all chief state public health physicians and their deputies.

Fines are imposed and collected and resolutions imposing fines are appealed in accordance with a procedure established by Turkmenistan legislation.

#### **Article 91. Criminal Liability**

Officials and citizens who commit public health violations that result or may result in mass illnesses, poisonings and death of people are subject to criminal liability in accordance with Turkmenistan legislation.

#### **Article 92. Submission of Materials on Public Health Violations or on Imposition of Criminal and Disciplinary Liability, or Application of Measures of Public Influence**

Chief state public health physicians and their deputies have the right to forward—in accordance with the established procedure—materials obtained as a result of state public health surveillance to resolve the issue of subjecting violators of health legislation, public health norms and regulations and hygienic standards:

- 1) for criminal liability—to organs of preliminary investigation;
- 2) for disciplinary liability—to the higher organ of state management or the higher official;
- 3) for imposition of measures of public influence—to organs of public associations.

### **Section XIII. Legal Status of Officials of the State Public Health and Epidemiological Service**

#### **Article 93. Legal Status of Officials of the State Public Health and Epidemiological Service**

Chief state public health physicians and other officials of the State Public Health and Epidemiological Service conducting state public health surveillance are representatives of organs of state management, and they are under the protection of the state.

### **Section XIV. International Treaties**

#### **Article 94. International Treaties**

Turkmenistan health legislation supports implementation of international treaties signed by Turkmenistan.

If regulations different from those foreseen by Turkmenistan health legislation are established in international treaties signed by Turkmenistan, the regulations of the indicated treaties apply.

[Signed] Turkmenistan President S. Niyazov

Ashgabat, 19 May 1992

#### **Footnotes**

1. Referred to subsequently as the health and epidemiological well-being of the population.
2. Referred to subsequently as enterprises, institutions and organizations.

**Chuchalin on Results of 'Man and Medicine' Conference**

927C0527A Moscow ROSSIYSKAYA GAZETA  
in Russian 28 Apr 92 p 2

[Interview with A. Chuchalin, academician, by S. Nikitin: "Let Politicians Cook in Their Own Pot. We're Busy". First paragraph is ROSSIYSKAYA GAZETA introduction in boldface.]

[Text] The Russian National Conference "Man and Medicines" was recently held in the capitol. It was the first time that a measure of such a scale was proposed under the aegis of a non-governmental structure, the Russian fund "Human Health", headed by academician A. Chuchalin. Our correspondent met with Aleksandr Grigorevich, having asked him to relate the goals and results of the conference.

[Chuchalin] Members of Soviet science, industrialists, and merchants met in Moscow. There were many foreign guests: Cardinal Angelini from the Vatican, famous American pharmacologists, representatives of the World Health Organization, and managers from European pharmaceutical industry enterprises.

The primary goal of the conference was to formulate a national program for the country in the field of medicine. Above all, Russia needs to adopt the concept of vitally important preparations, or to sound more like the English, "essential drugs". That is, we need to clearly define a list of medicines on which the life and health of the nation depend. It is short, 230-250 drugs in all.

After compiling the list, we need to ensure that two extremely important principles are met: accessibility of these drugs to all members of society and responsibility of the government for their quality. These principles are in effect in all civilized countries. But for them to work here, the concept needs to be adopted at all levels: from parliament and the President to each practicing physician.

The President is obligated once a year to report on the health status of the nation and analyze the drug supply. This is what Bush and the leaders of a number of other countries do... Parliament needs to create a special committee on drugs where the list of "essential drugs" would be made more precise, the appeals of scientists would be reviewed, applied science conferences would be organized, money from the state budget would be allocated for pharmacology, foreign partner companies would be selected, and finally, work would begin on the bill on "medicines".

[Nikitin] Why shouldn't the establishment of such a committee be limited to the Ministry of Health or Rosfarmatsiya [Russian Pharmacy]?

[Chuchalin] A national committee on medicines could only successfully perform its duties with a supradepartmental structural unit with a higher agency of legislative power. After all, what is happening now? For example, as late as December the President signed a decree to allocate more than a billion hard currency rubles for the purchase of medicines. But four months have passed, and the Ministry of Finance has been limited to 12 million rubles, and the matter has come to a standstill. Western firms to which

Russia owes approximately 100 million dollars have naturally stopped shipments. And neither the Ministry of Health nor Rosfarmatsiya can do anything about it.

Moreover, the departments and organizations in the hands of the SKV [as published] cannot trust the selection of foreign partners. Sad experience has shown that they will compromise us in this case in an instant.

[Nikitin] Today, with the costs of virtually all medicines spiraling, how do you plan to make them accessible?

[Chuchalin] There is not one country in the world that allows the market to set the price for medicines: the government strictly regulates them. Therefore, the principle of accessibility there is not just on the paper. But what is happening to us today is a serious mistake.

What is the solution to the situation? The first step should be privatization of the pharmaceutical industry. With a private trader we can cooperate on the list of vitally important medicines. Licenses will be issued only when government orders at the regulated prices are met. And in turn they may be allocated certain subsidies. This mechanism has been in place for a long time abroad, and there are no problems with it.

But our own capacity for saturating the internal market in Russia is clearly insufficient. And, frankly speaking, we do not have a single factory or production line that meets modern international standards. Russia has enough qualified scientists, and we are learning to manufacture quality substances, but the technology and culture of production remain several decades in the past.

Therefore, we need to look to the West. Unified Europe in the near future will be forced to close approximately 30 percent of its pharmaceutical enterprises in various countries. We have the unique opportunity to profitably acquire several factories and solve the problem of the medicine famine. The main thing is to not err in selecting a partner and avoid the temptation to pursue low prices.

An agreement should only be made with large companies with a high international reputation. I see the German company Khekhst, with its modern research base and respective technology, as such a partner. Wonderful scientists, three of whom are Nobel laureates, work there. Representatives of Khekhst were at the conference and expressed that they were ready to build a complex in Russia similar to university towns. With research centers, a developed infrastructure, villages composed of single story cottages and modern factories.

[Nikitin] Many of our citizens are rushing to do business with medicines. Tablets, homemade remedies, and herbs are being sold right on the streets... How do you view this?

[Chuchalin] Terrible things can happen when this process is not under government control. At the conference I met a colleague who had developed a good drug about five years ago. It was manufactured and at first everything went well. And then complaints began to be aired: the medicine lost its effectiveness. It was tested and found that the cooperative employees were adding ordinary water to the ampules,

sticking the labels on the boxes, and selling them as this medicine... This would be impossible in a normal country! Because they have a law about medicines that punishes even unlicensed private trade, not to mention swindling that is hazardous to the people's health.

[Nikitin] What is preventing us from adopting such a law?

[Chuchalin] We need to attract the strongest independent experts to prepare such a bill. In our country I do not see a single appropriate person. But there are a number of well-known foreign specialists who were involved in the conference, in particular Professor Hays, personal consultant to Bush, who has already agreed to help. Now we only need to establish a national committee on medicines that would organize this work.

Incidentally, in the United States such a law was passed and supplemented approximately 100 years ago. It is now a thick book that takes into account all the nuances of price fixing, quality control, patenting, rules for trade, etc. We have to begin at the bottom using all the leading experience.

[Nikitin] The concept of vitally important medicines according to our intention will be determined in the capitol. Won't it conflict with regional interests?

[Chuchalin] A mixed program will never be acceptable to Petersburg and Vladivostok, Magadan and Sochi at the same time. Therefore, with all its rigidity, the basic concept should be adapted at a regional level and altered, say, once every two years.

[Nikitin] Doesn't it seem to you that implementing all these good intentions under current conditions will be extremely problematic? The concept, bills, and programs, approved "at the top" will remain on paper if they ignore the rank and file physicians whose living conditions are deteriorating from day to day.

[Chuchalin] Without any doubt, the leadership of the country is obligated to immediately consider the material situation of physicians. But I am convinced that in any case most of them will understand our ideas.

We invited students from the Moscow medical higher educational institutions to the conference to hear the leading pharmacologists of the world; however, few believed in the success of this venture. Nevertheless, the hall was filled by eight that morning. Yeltsin sent a welcoming envoy to the conference. Somewhere not too far away a Congress was being held, but no one even said a word about the quarrels going on there. We wanted to tell the public, "Let's announce a moratorium on political matters. After all, there are so many important spheres to which each may give his energies. Let the politicians cook in their own pot. We are finally engaged in some real work."

**Greek, Ukrainian Ophthalmologists Develop Ties**  
927C0527B Kiev *RABOCHAYA GAZETA* in Russian  
22 May 92 p 2

[Article by I. Logay, professor and director of the Odessa Scientific Research Institute of Eye Diseases and Tissue

Therapy imeni Academician V. P. Filatov. First paragraph is *RABOCHAYA GAZETA* introduction in boldface.]

[Text] Medicine as a science has never been limited to the interests of any one nation or government. Since ancient times scientists have collectively solved the most complex problems of controlling diseases, supported one another, and shared experiences. The advances of scientists at our Odessa Institute of Eye Diseases and Tissue Therapy imeni V. P. Filatov, which in many countries of the world is justly called the Institute of Light, have enjoyed widespread international recognition. The fundamental research performed over the past few years has led to important scientific discoveries.

The institute was the first in the world to successfully use the laser with superpowerful pulses for the intricate treatment of a number of diseases of the retina, for creating an artificial pupil, for slashing adhesions of the iris, etc. We see the invisible ultrasound help the ophthalmologists. Ultrasound echography tells us whether the lens is in place or absent, whether there is retinal detachment, tumors on the fundus of the eye, or serious alterations in the vitreous use of cold in ophthalmology. In a word, there is something to be proud of and something to share with the collective of the institute where I have the honor of being director.

Like my colleagues, I have been able to go abroad and represent Ukrainian medical science and health service at international scientific conferences and develop creative ties with scientists from different countries. The interest is particularly great in Ukrainian science now, and this is understandable. I recently visited Greece as part of a delegation of scientific workers in Odessa, Moscow, and St. Petersburg.

Our connections rely on ancient, centuries-long traditions, the unprecedented affection of our peoples, and on their historical closeness. The ancient Greek culture and democratic foundations of society had an enormous impact on Kievan Russia. All of this has always given and will give our connections with the country of ancient Ellada a certain character. We concluded an agreement on the joint execution of a complex science program "Improving methods of treatment of the cornea and retina of the eyeball".

In order to research this problem colleagues Yelena Vladimirovna Ivanovskaya and Natalya Aleksandrovna Chudnyavtseva from our institute traveled to Athens. The trip was extremely successful and helped solve a number of urgent problems. Professor Kolliopulos, assistant professor D. Drutsas, and my former graduate student and present Athenian physician K. Mukhturis visited our institute from the Greek side. The anticipated impact of executing the joint Ukrainian-Greek ophthalmology program was to increase the effectiveness of treating patients. Now many specialists want to come to our institute for an internship. It is not surprising that the Odessa Institute of Eye Diseases is very popular in this country. We have more foreign patients from Greece than from any other country. There is a family here with four members that I have already successfully operated on.

In Patra, a small town similar to our Mukachevo or Khust, I was able to give a report at a symposium on surgical restorative treatment following injuries to the eye. The Greek physicians inundated me with questions. Our colleagues were interested in everything, both the current status, problems, and prospects for the development of ophthalmology, and in the novel methods of diagnosis, treatment of eye diseases, and in my personal achievements in surgery to correct injuries and burns to the eye.

Nature created man when he did not need to read, trouble with clockwork, or study an atlas. Millions of years of development have little altered the structure of the human eye. And it is not very well adapted to modern life. In our fast-moving century, with its rapid paces and superfine instruments, the microelectronics of the eye take on particularly important significance. A person who has lost his normal vision faces great difficulties. He is extremely limited in his choice of occupation. Ophthalmology has vigorously developed in the recent past. That which even a few years ago seemed to be science fiction is now commonplace. Today we can replace all the parts of the eye, perform any reconstruction, and make the eye better than nature did.

Now, in Greece, I am again convinced of the importance of our educational activities. With our consultations, scientific communications, and instructional operations we are clearing the road for our methods of medical practice and our instruments. I do not keep secret the achievements of the collective at the institute and the personal techniques of treating burns and injuries to the eye.

In the splendid ancient city of Athens, we visited the science center "Demokritos", which is comprised of eight scientific research institutes of nuclear physics, biology, information science, etc. Naturally, for me as an ophthalmologist, becoming familiar with the work of the Chair and Clinic of Eye Diseases at Athens University, directed by the famous ophthalmologist Professor G. Teodossiadis, was of particular interest.

The main directions of their work are the treatment of the cornea and use of lasers in ophthalmology. The clinic does not have its own lasers. There are four blocks in the operation area, eight halls with a table each. I attended operations on cataract removal, surgery following injuries, retinal detachment, etc. At the request of my Greek colleagues I myself performed a number of instructional operations and consulted with patients for whom no diagnosis had been given. Although the assistants and physicians at the Athens Eye Clinic know our institute well, they were very interested in hearing the report on the direction of scientific research of the Filatov colleagues.

At the end of last year we signed an agreement in Athens concerning yearly visits of 800 Greek patients to the Odessa Institute imeni Filatov for consultation and treatment and a protocol for establishing a joint venture in Odessa for the diagnosis and treatment of patients with eye diseases.

We also visited the island of Kos, the birthplace of Hippocrates. It was here in the thick shade of the enormous plane tree that the great physician confided the secrets of the physicians' skill to his students. The Hippocratic Oath.

From the grey depth of the centuries, forcing their way through the pillars of human history, the moving words have come to us: "I will conduct my life and skill purely and innocently... Whatever house I enter, I will enter there for the benefit of the patient..." They have fully maintained their purity and trepidation, the magical power of moral devotion to the physician's duty and to their high calling. We are ever more often turning to the words of the Hippocratic Oath. Even today they are pronounced by physicians throughout the world as they embark on the sacred path of healing.

We held some interesting discussions with the Athens ophthalmologists on whether Homer was blind. The entire enormous narrative literature of Homer sparkles and shines with the variety of colors. He portrays the aspects of a great poet—amazing imagery and accuracy of descriptions, vividness of scenes, and clarity of the characters on a specific color background. The intense color range of the poem "The Iliad" is similar to color television. Incidentally, numerous textbooks also agree that the legendary ancient Greek poet Homer was blind. A bust of Homer from the Hellenic period that has lasted to this day also suggests this. It shows the poet with no pupils in his eyes, which are turned to the sky.

The greatest master of the word, who was able to cross the visual bridge from the unimaginable depths of time to our day and convey the thought, feelings, colors, and shades of the past to the present, was blind. For some reason the literary scholars have not noted the irony of this situation. The poet, like any person, uses his vision, hearing, smelling and touch, to convey into art form the information about the shape of objects and their color and sound, and finally, how they feel. If Homer was really blind, sound would unavoidably have dominated in his poems, and then smell and a description of surfaces, how things feel, especially with the sensitive tips of the fingers. A colleague had familiarized himself with the research of candidate of sciences A. Portnov, who counted the descriptions associated with our sense organs in Homer's texts. The results showed that approximately 85-90 percent of the information about the outside world came from vision, 8-9 percent from hearing, and the rest from smell and touch. Such a distribution is completely in line with that for a healthy person for whom vision, as we know, supplies up to 90 percent of the information about the outside world. Hence the conclusion that Homer was not blind. It is possible that he became blind in middle age, after having accumulated a great reserve of visual impressions. Or he composed his poems before losing his sight, like Beethoven composed his music before progressive deafness set in. But in any case, one thing is sure: blindness is in no way reflected in the work of Homer. His poems convey to us the colors, splendor, sounds, and smells of the ancient world, creating a sense of an astonishing gap through time.

The attitude in Greece toward our people has long been a good one. Our Athenian friends said many times that the bonds that unite our people are marked not only by their centuries-long history, but also by their strength.

Our meetings with Athenian scientists were fruitful and interesting. We know that the truth is born of discussions.

There were many discussions on the land of Ancient Helena, and this permitted us to confirm the correctness of some positions, reevaluate others, and outline the more perspective directions for research.

### Antismoking Campaign Begins

927C0527C Moscow NEZAVISIMAYA GAZETA  
in Russian 1 Jul 92 p 6

[Article by Ye. Voronenkova]

[Excerpt] [Passage omitted] Only now are our physicians becoming seriously engaged in the work of their western colleagues with respect to smoking prophylaxis. One of the examples of this is the international conference on smoking control, which was recently held at the Oncology Research Center of the Russian Academy of Medical Sciences. The medical and social aspects of smoking were discussed. As always, the facts presented by the physicians were frightening: During this decade 21 million people will die in developed countries from smoking related diseases. Five million of these deaths will occur in the former USSR. More than half of these will be aged 35-69 years, losing an average of 23 years of life. The number of deaths associated with smoking in the ex-USSR is growing: Whereas in 1985 this figure was 378,000 persons, predictions for 1995 indicate that it will exceed 500,000. According to statistical data, the most depressing data in Russia, the lung cancer morbidity rate in some cities of the Russian Federation has exceeded the highest incidence rates recorded anywhere in the world. As far as morbidity among the small populations of the north and Far East are concerned, the incidence rate is astronomical.

Academician David Zaridze, director of the Carcinogenesis Scientific Research Institute at the Oncology Research Center, believes that with respect to the high lung cancer morbidity rate, 85-90 percent of cases can be attributed to smoking, with only 10-15 percent of cases attributable to a specific occupation or air pollution. David Zaridze, who believes that a campaign against smoking in Russia should include "comprehensive measures for controlling smoking, including legislative measures," presented journalists with a bill developed by the Scientific Research Institute scientists to go to the Russian legislature for smoking prophylaxis.

It discusses the "planned decrease in the maximum amount of resin in the cigarettes to 15 mg, based on the EC example". It further suggests not only increasing the cost of cigarettes "to decrease their demand, especially to protect children and teenagers from them," but also "to ban the production of all new forms of tobacco and other nicotine-containing products within Russia, with the exception of preparations used to treat smoking." Moreover, it envisages the transition of these branches to other forms of agricultural and commercial activity.

A national campaign against smoking is certainly needed in Russia, but unfortunately the methods of combatting smoking are similar to the well-known anti-alcohol edicts issued by Gorbachev and Ligachev. Mildly speaking, these edicts had the opposite results. Zaridze announced that we

need to prevent major foreign tobacco-producing corporations from penetrating the Russian market, which is the goal of the above-mentioned bans. The academician is not afraid of the Russian tobacco producers, since advertisements for their products would seem silly in comparison to an advertisement by Philip Morris.

The conquest of our market is not beginning, but already began long ago. In 1988 Philip Morris sent provisions to the area of the earthquake in Armenia, and in October 1989 the jazz group Marlboro Superband performed American jazz classics in Moscow. Philip Morris calls itself the "leading exporter of cigarettes to the CIS" and there are documents showing that as early as September 1990 Philip Morris signed an agreement to deliver more than 20 billion cigarettes to the Russian Federation before the end of 1991. In addition, protocols were signed for the "continuous delivery of large quantities of cigarettes to Russia for 1992-1995 and for long-term cooperation with the RSFSR government and organizations in the field of commercial development for cigarette production." And we need to note that the company came to the aid of the former USSR when there were tobacco rebellions in Moscow and other cities. It is clear that physicians also need to take these facts into consideration.

Finally, it was publicly announced that cigarettes were being sold on the Russian market with the maximum amount of toxic substances, cigarettes generally rejected by the markets of the supplying countries (the most toxic are Yugoslavian, but Marlboro is also being sold here that does not meet international standards). As before, the lowest quality cigarettes are domestic; they contain more than 20 mg of resin with a very high level of nicotine and carbon monoxide (western cigarettes do not have more than 12 mg of resin). But scientists are evidently limited by the report of only these data. Therefore, the question of the level of radiation of the cigarettes flooding our market disconcerted them.

The question of radiation is not fashionable. For example, six months ago all of Europe was warned about the highly radioactive Marlboro produced in Poland, just a little bit after the German press was dotted with reports of an inexpensive but radioactive Turkish tea. A mysteriously inexpensive Turkish tobacco recently appeared in Moscow, and there is no guarantee that it is any better than the infamous tea.

Fortunately, the bill in the Russian legislature recommends "providing special assistance for smokers wishing to kick the habit" and "putting together special educational and information programs for the public".

Perhaps it would be better to refrain from the prohibition methods and develop effective and accessible medical assistance for smokers and think about how to saturate the market with high quality, less toxic cigarettes, after introducing modern technology and standards.

### Health Problems of Russian North

927C0527D Moscow ROSSIYSKAYA GAZETA  
in Russian 22 May 92 p 4

[Article by A. Demin, deputy director of the Service Department of the Russian Federation Gossovetnik on Ecology and Health Protection Policy: "All Is Well, But Children Are Dying".]

[Text] The extent and low population of the northern territories severely complicates their socio-economic development. Especially with regards to health protection services.

At first glance, things are not so bad. According to some indexes the health of people in the north is better than for Russia as a whole; the birth rate is higher, the total mortality rate is lower. And the index for natural population increase among the native peoples is two-fold higher than among the northerners as a whole. With these data in mind, it would seem unnecessary to discuss the "extinction" of the people in the Russian north.

Nevertheless, if we look more closely, we see a number of extremely acute problems in the areas inhabited by small numbers of people. These problems are due primarily to the socio-economic development of the territories. Here the infant mortality is higher in comparison with Russia as a whole, especially in the Evenkiy Autonomous Oblast, Nenets Autonomous Republic, and the Taymir (Dolgano-Nenets) Autonomous Oblast. The high mortality rate of able-bodied people in the north is also troubling. The most common causes are accidents, poisonings, injuries, and circulatory system diseases.

The support services here for the people clearly do not correspond to the difficulties a person living in the region faces. Produce is insufficient. There are not enough residences, even poorly built ones. Virtually everywhere the preschools and schools are overfilled.

The high morbidity rate of the people with intestinal infections, active tuberculosis (especially in Khanty-Mansi Autonomous Oblast, Koryak Autonomous Oblast, and Yamalo-Nenets Republic) can be attributed to the poor living conditions. In a number of areas there is a high level of chronic alcoholism and venereal diseases. In the north there is a higher morbidity rate with all forms of malignant tumors than in Russia as a whole, especially in Sakhalin and Murmansk Oblasts, Sakh Republic, Kamchatka, Tyumen, and Magadan Oblasts, and Komi Republic.

What should be done to improve public health in northern Russia? First of all we need to correctly assess the health status and factors affecting it and correctly "diagnose" the problems. Goskomstat data are clearly insufficient for this. We need to thoroughly study the problems of the different regions of Russia and the relationship between public health and the environment and aspects of the living conditions and lifestyle of the people. Such an analysis would make it possible to review the classification of the territories of the country, the ranking of each of them in this classification, and re-allocate the available resources in accordance with the true priorities—the health and welfare of the people.

We should eliminate as much as possible the obvious differences between the direction of socio-economic development in the native peoples and their ethnic aspects, although it may be that some of the native population would no longer be comfortable with a return to a traditional form of life.

The migrational flows of people from other regions of the country to the north have slowed, but they have not stopped. We need to be concerned about these people as well as about the native population and create acceptable economic and living conditions in the social structure, including health protection services.

The above indicates the need for transferring responsibility for public health protection in these territories to federal agencies.

Man is a part of nature. Nature in the north is extremely vulnerable. Any disturbance to it, a tragedy forever, will have a deleterious impact on the health of generations. Therefore, mandatory ecological expertise in the construction of commercial plants should be particularly stringent. Energetic efforts for the introduction of ecologically safe production processes and hygienic labor conditions are necessary.

### **Chernobyl Compensation Law Criticized**

927C0530E Moscow *RABOCHAYA TRIBUNA*  
in Russian 24 Apr 92 pp 1-2

[Article by G. Dolzhenko, under the rubric "Chernobyl: Six Years Later": "A Misfortune for Some, A Gain for Others"; first paragraph is source introduction]

[Text] I wouldn't be surprised if one fine day, I see on the television screen or the movie screen some rollicking hit about Chernobyl. Something like "Ekipazh" [Crew].

The farther April 1986 goes into the past, the dimmer the details get of the tragedy. We've been befallen by new tests in the form of the breakup of the Union and the bloody internecine wars, the fall of governments, and the wild liberalization of prices. If only we survive it all. Which is why the problems of Chernobyl are moving unnoticed to the background and are becoming something less than the burning issue they used to be, in the public's mind, but not in actuality.

More than 5 million people are now living in 77 rayons of Ukraine that were covered with the lethal cloud, and the status of their health is causing alarm. According to the data of the ministry of health, pathology affecting the immune system has grown there three- to fourfold; diseases of the blood 1.5- to twofold; pathology of the endocrine system—including thyroid cancer, chromosome damage, and gene damage—dozens of times over. Overall morbidity and mortality have increased three- to fourfold.

And take another problem—the resettlement of people from contaminated regions. Plans were to complete it in 1990, but the program today is only 10-12 percent done, and judging from everything, it's unlikely that it will be completed at all.

A law that was adopted on the eve of the fifth anniversary of the tragedy, "On the Status and Social protection of Citizens Who Were Victims of the Chernobyl Accident," called for a great deal that was useful and necessary and for all kinds of privileges: free transportation, priority in getting housing, special stores and lower prices for products, tax exemptions, 50-year pensions, and much more.

That was supposed to be the state's way of repaying some of the debt it owed to people who, through the fault of the state, suffered the horrors of the nuclear apocalypse. But it was all done clumsily, in a hurry, on a wave of populism.

The final devastating blow to the law was delivered on the very eve of the sixth anniversary by the government of Ukraine, which cut the appropriations for the program by more than half. That can be explained. If, in the beginning, there were 11 billion rubles [R] for implementing the law, the liberalization of prices and the dispiriting march of inflation would have required some R80 billion more. With the huge budgetary deficit, that sum couldn't be handled by the treasury, and some 70 percent for the law had to be frozen. But I think that it wasn't even the economic crisis that affected the decision of the government, and then of the parliament.

The first category of victims consists of those who linked their illnesses with the effects of radiation. They received the most privileges under the law, and I think that was rightly so. It would seem that the individual deserved that kind of treatment and some rest. But a check shows that almost all of them continue to work. The Ministry for Chernobyl apprised me of that fact. All the officials of the NPO Pripyat—79 individuals—registered themselves in the first category, but remained in their former posts and with triple salaries.

But most of the criticism is being evoked by the second category, in which are mainly people who took part in the cleanup of the accident at Chernobyl. Let me note that for services provided to each cleanup crewmember, the republic spends an average of R20,000 a year. The law, however, gives equal rights to those who carried a thousand-roentgen piece of graphite in their hands on the roof of the reactor, those who cemented the sarcophagus, and those who just once went across the perimeter of the 30-km zone for a just hour.

Today, agents are knocking on every office door with demands that they be listed among the victims simply because they dressed meat that came out the zone, or because they read lectures at Zelenyy Mys to the cleanup crews, or because they gave an hour long concert in the zone. But that's only half the problem. Until very recently, various ministries, departments, councils, and even enterprises were writing out Chernobyl certificates. The lack of control and the deception regarding privileges have given birth to thousands of phony cleanup-crew members, especially among officials. With trip forms and stamps available to them, some have contrived to back-date for themselves trips into the zone.

Such was found to have happened in the trust Ukrpromspetsstroy. They made Chernobyl documents there that were quite authentic, but they overlooked one small detail: the trip certificates alluding to 1986 had actually been printed in 1990. That became known because of indignant group letters that went to the appropriate agencies. And how many such "heroes" have yet to be identified! According to various estimates, of the 140,000 certificates that have been

issued, some 20,000-40,000 are in the hands of those who didn't earn them but misappropriated them.

Chernobyl illuminated yet another disease of our society, one that is not really new, but in this situation, is sickening for the cynicism and moral decay it represents. Under the signboard of Chernobyl, dozens of charitable and other organizations have sprung up that beat the bushes in the West for humanitarian aid and divide it among themselves, open up small enterprises and various associations, and, using the tax exemptions, engage in questionable commerce—they rake in everything that's not nailed down.

Often, heading and making up such organizations are people who have nothing whatsoever to do with the accident, but the forms with the magic word "Chernobyl" open doors for them to all the institutions and to plants. Right now, the procurator's office is investigating a case involving the Union of Chernobyl Workers. Sending out letters to all the enterprises and trade organizations with a request—for the needs of the Chernobyl people, of course—for televisions, refrigerators, clothing, candies, cognac, and other things in short supply, they then resold them for personal gain.

Things even went so far that such dealers began to manufacture Chernobyl certificates and gave out about 6,000 of them! To what depths of impoverishment we have sunk!

It is becoming increasingly apparent today that the whole Chernobyl problem needs to be thoroughly cleansed of the fungus of incompetence, the self-seeking schemes, the pilfering, and all the speculation. An administrative agency for the zone was created recently, and it was given special powers. One would like to believe that it will bring order to the many organizations and to the distribution of appropriations. The time has come to look into the laws involving Chernobyl and make them suitable for the market economy conditions. The special stores and other nice things are remnants of yesterday's notions of fairness. Our own, Ukrainian certificates for the Chernobyl people are being prepared now in the republic, and when they are substituted, the cleanup people will go through a very fine sieve before receiving any sacred booklets.

However, one would hope that the sensible kernels are not shaken out in the reformer's ardor. For example, in the decree adopted on 25 March of this year by the Cabinet of Ministers, "On Measures Associated With Taking the Chernobyl AES Out of Service," the money for station maintenance and for the needs of those working there was to come from the money allotted for cleaning up after the accident. Why isn't it coming from the Ministry of Energy? The station, after all, is a production unit! The draft budget for Ukraine for this year also plans to remove the concern for the cleanup of the accident from the shoulders of the state. The program is to be financed out of an off-budget fund, i.e., through a Chernobyl tax levied on enterprises. But if it was 19 percent of profits before, now it has been lowered to 12 percent.

To a large extent, what would help untangle the knot of problems associated with that 26 April of six years ago is a closer cooperation among three powers—Ukraine, Belarus, and Russia. A good many issues of an interrepublic nature

are cropping up: research, medical, environmental-protection, and social issues. We need to jointly forecast the status and movement of radionuclides and come to an agreement on the order and number of operations involving leukosis patients—they're done only in the Sixth Moscow Clinic and in the St. Petersburg Military Medical Academy.

**EC Approves Emergency Aid to Russia**

927C0532B Moscow *NEZAVISIMAYA GAZETA*  
in Russian 15 Jul 92 p 4

[Article: "Medical Credit From EC"]

[Text] A conference of finance ministers from the twelve countries of the European Community approved a program of emergency aid to Russian medicine for a total sum of 150 million EKYu (204 million dollars). The decision in favor of additional release of credits was approved primarily under

pressure from the French delegation. This sum may only be used for procuring drugs and medical service.

**Donated German Medicines Unfit for Use**

927C0532C Moscow *NEZAVISIMAYA GAZETA*  
in Russian 28 Jul 92 p 6

[Article: "Germans Donate Expired Medicine"]

[Text] Fifty percent of the medicines sent from Germany to Kaliningrad as humanitarian aid are unfit for use; they expired long ago. This only happens when the medicines come from private entities. Tons of useless medicines have accumulated in the city. Their use under our conditions is problematic.

The administration of the Kaliningrad Oblast decided to request that the social organizations in Germany send medicines only through the Red Cross.

### CIS Establishes Commission on Reform of Forensic Psychiatry

927C0530I Moscow NEZAVISIMAYA GAZETA  
in Russian 3 Jul 92 p 6

[Article by A. Banduzhiy, under the rubric "Medicine": "Forensic Psychiatry on the Threshold of Change: The States of the Commonwealth Have Begun To Divide Up the Mentally Ill"]

[Text] Decades of Soviet power firmly attached the designation "punitive" to Soviet psychiatry. It will apparently take years for that image to fall away, but incidents like the recent scandalous discovery of a U.S. citizen in a Moscow psychiatric hospital will hardly help to establish a new image of Russian psychiatry in the eyes of the public. Forensic psychiatry occupied a special place in Soviet psychiatric science, and its history, like a mirror, reflected all the fluctuations of repressive state policy.

In 1930-1950, almost 100 percent of those sent to forensic-psychiatry examinations were judged to be of sound mind. To corroborate that an individual under investigation was mentally ill was to free him of criminal responsibility—for such an act, and the psychiatrist himself could become the focus of the repressive agencies. But the majority of those who fell under the wheels of the punitive machine went without any kind of examination—during the times of extrajudicial sentencing, that was considered an unusual luxury. In the two decades that followed, psychiatry itself became one of the forms of extrajudicial sentencing: Those who didn't please the regime were pronounced abnormal. In some years, as many as half of those sent for examination were pronounced of unsound mind under articles 70 and 190 of the criminal code.

Determining the exact scale of the use of punitive psychiatry in various periods of Soviet history is very difficult, and often impossible. In 1941, when the Germans were advancing on Moscow, the prewar archives at the Serbskiy Institute, which contained the main data on forensic psychiatry for that period, were destroyed. Research involving later periods is hindered by the secrecy around most of the documents.

The old system of forensic psychiatry clearly presents problems in the transition to a rule-of-law state. Specialists are already predicting a sharp increase in the number of different types of examinations and a change in their structure: If today more than 90 percent of examinations account for criminal proceedings and less than 6 percent account for civil proceedings, in the future that relationship will be switched—in developed European countries, more than half of the examinations involve civil proceedings. In the meanwhile, even now the forensic psychiatry commissions are not able to handle the growing volume of work, and the lines are getting increasingly longer for examinations. For all of Russia there are only 212 professional forensic psychiatrists, and a substantial number of examinations are conducted by general-practice psychiatrists, which, naturally, affects the quality of the examinations. Only 10 percent of physicians have appropriate legal training.

In 1991, only one in 10 who were under investigation were sent for forensic examination, and 7.3 percent of them were pronounced of unsound mind and were freed of criminal responsibility, which roughly matches the average European level. However, being of sound mind and mental health are far from the same thing. Three of every five who undergo examination are identified as having serious mental disturbances—a figure that attests not so much to the composition of the criminal world as to the mental health of our nation. Because of the overload felt by forensic psychiatry commissions, increasingly more patients who did not undergo a forensic psychiatry examination are ending up in prisons. According to statistics recently released by the Ministry of Internal Affairs, in 1990 alone some 55,000 individuals incarcerated with mental disorders entered prisons and camps—that's twice as many as seven years ago.

Yet another problem paralyzing the work of examining commissions is the low level of safety for physicians. Special hospitals and forensic-psychiatry examination departments have been switched to the Ministry of Health, whereas security is provided by the Ministry of Internal Affairs and involves only a head count, and not the conditions associated with the keeping of the individuals: inside the departments, those under investigation are under their own recognition. The medical people are unprotected from their patients, and attacks on physicians are changing from an unusual event to an everyday happening. Even in the best research institute for general and forensic psychiatry—where the security is provided not by the militia, but by internal-affairs troops, and not just around the perimeter, as everywhere else, but inside the departments, too—such incidents are far from rare. As a result of attacks, one physician had his eye pricked out, and another physician had his skull fractured. In June 1991, a group of criminals almost took a World Psychiatric Association delegation visiting an institute hostage. That year, an armed assault on the department of forensic psychiatry in Kursk was averted at the last moment.

The shortage of money led to some forensic-psychiatry examining commissions starting to introduce fees for their services—the cost of one examination was as high as several thousand rubles. Only a special protest lodged by the procurator's office of Russia was able to stop physicians who had started doing that, but the measure is hardly capable of changing anything for long without large financial infusions. In the near future, the process will begin of fundamentally reducing the number of examining commissions, and then there simply won't be anybody to conduct examinations. One need not guess how that will affect the thousands of mentally patients.

Every year, about 10,000 mental patients undergo various forms of mandatory treatment in Russia. Four thousand of them are kept in strictly controlled hospitals—prison-like medical facilities. The World Association of Psychiatrists has more than once demanded the closing of three of seven such hospitals—the conditions in which the patients are kept are not compatible with any sort of treatment. But they can't be close right now, because their patients, who are a danger to those around them, would end up out on the

street. What has also been a headache for psychiatrists is the collapse of the Union: The republics have begun dividing up not only the army and the foreign debt, but also the mental patients. Recently, a Tashkent strictly controlled psychiatric hospital required that 38 patients be picked up from it—they were citizens of the Russian Federation.

The fact that forensic psychiatry needs to change is unquestionable. And the first steps in that direction have already been taken. Academician Morozov, who has soiled himself by applying the label of mentally ill to dissidents, has been removed from the post of honorable director of the Serbskiy Institute. A commission is being created for the reform of the forensic-psychiatry examining service. From the look of it, in the near future the first nonstate examining commissions will appear—that will provide participants in the process the freedom to choose among various specialists and will dramatically raise the quality of the examination.

But to remove the burden of the problems that have accumulated over decades, the efforts of the medical profession alone won't be enough. Physicians have long awaited

changes in the criminal code that call for mandatory outpatient treatment. Only that measure will provide substantial relief for the hospitals and will create normal conditions for those who are hospitalized. In need of revision are the obsolete joint instructions by the Ministry of Health and the Ministry of Internal Affairs that define the activity of special psychiatric treatment facilities. There is yet to be any legislative solution involving the rehabilitation of all the victims of psychiatric terror—according to some estimates, several thousand individuals were victims of that in Russia. And finally, we still need laws pertaining to psychiatry and the forensic-psychiatry examination.

Without all that, it is impossible to speak of the total objectivity of forensic psychiatry or of the true independence of the examiners. And the fact that pressure can still be applied to them today was demonstrated by the recent events in Ostankino. Physicians observed with alarm how, once again, but now by the other side, people were trying to drag psychiatry into political games: calls to place the participants of opposition meetings under psychiatric observation resounded from the highest platforms.

### Hydrogen Breath Test for Small Intestine Assessment in Ionizing Radiation-Exposed Chernobyl-Cleanup Personnel

937C0016B Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 64 No 2, Feb 92 (manuscript received 30 Jul 91) pp 74-77

[Article by P.N. Lyubchenko, Ye.B. Dubinina, A.V. Petrakov and E.A. Bendikov, Moscow Institute for Advanced Training of Physicians imeni M.F. Vladimirskiy; Central Scientific Research Institute of Gastroenterology, Moscow; UDC 616-341-055.1-02:614.876]-07]

[Abstract] Hydrogen breath studies were performed on 67 men—23 to 45 years old—who had participated in the Chernobyl cleanup and had sustained exposures of 10 to 22.5 rem of ionizing radiation. On balance, the studies yielded normal results in 30 (44.8 percent) of the subjects (motility, bacterial levels, and  $\beta$ -galactosidase levels). Deficiency of  $\beta$ -galactosidase was observed in 23 (34.3 percent) subjects, and 24 (35.8 percent) displayed an overly high bacterial growth. Finally, in 12 cases overly high growth was associated with  $\beta$ -deficiency. The large number of cases of overly high growth remains enigmatic since achlorhydria was noted in only two of the men and shall be a focus of further studies. References 28: 14 Russian, 14 Western.

### Blood Paramagnetic Centers of Chernobyl Radiation Victims

937C0021A Kiev VRACHEBNOYE DELO in Russian No 4, Apr 92 (manuscript received 05 Dec 91) pp 7-10

[Article by V.G. Bebeshko, V.I. Klimenko, prof., L.N. Yukhimuk, dr. med. sci., and I.M. Pogontseva, cand. biol. sci., Department of Hematology, Institute of Clinical Radiology, Ukrainian Scientific Center for Radiation Medicine, Kiev; UDC 616.1:616-001.28]

[Abstract] EPR examination of venous plasma samples obtained from 14 patients who had sustained radiation

injuries as a result of the Chernobyl accident revealed certain deviations from the results provided by 50 control subjects. The signal intensities of the control group for  $\text{Fe}^{3+}$ -transferrin,  $\text{Cu}^{2+}$ -ceruloplasmin, free radicals and methemoglobin were 21.6, 22.0, 9.0 and 3.4 rel. units, respectively, while the corresponding intensities of the patients were 18.9, 16.8, 16.1 and 8.5. Interpretation of the differences was made difficult by wide scatter of the results (eg, 11.0 to 38.2 rel. units for  $\text{Fe}^{3+}$ -transferrin) in the patient cohort. Nevertheless, these observations indicate profound changes in- and depletion of the antioxidant reserves. In addition, fluctuations in free radical EPR signals reflected alterations in secretion of the biogenic amines. References 4: Russian.

### Medical Rehabilitation of Chernobyl Pediatric Victims at Alushta Health Resort

937C0021B Kiev VRACHEBNOYE DELO in Russian No 4, Apr 92 (manuscript received 29 Aug 91) pp 10-12

[Article by I.M. Padalko, Yu.P. Knysh and N.Ye. Yevtushenko, Alushkurort Association Health Resort Polyclinic; UDC 614.876:616-053.2-085.838]

[Abstract] Clinical assessment of 375 children from areas with elevated levels of radiation as a result of the Chernobyl accident showed that 52.16 percent suffered from upper respiratory diseases, 29.3 percent from stomatologic problems, 18.34 percent from thyroid hyperplasia, 13.96 percent from chronic bronchitis, 4.11 percent from neuroses and 2.53 percent from hepatitis. Only 8.15 percent were classified as well children. The incidence of thyroid hyperplasia in preschool children was 56.3 percent. As a result of rehabilitative measures at the Alushta health resort—in combination with symptomatic treatment—99.63 percent were discharged in a state of good health. These findings underscore the importance of proper nutrition, rest and climatic treatment in the management of children subjected to prolonged radiation exposure.

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